Gelman Sciences Inc. 642 South Wagner Road Ann Arbor, MI 48103 734.436.4025 phone 734.436.4040 fax

### **CASE NARRATIVE**

Monthly Data Gelman Sciences Project: 1,4-Dioxane Remediation

Date: October 2021

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition, all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Gelman Sciences Inc. attests to the validity of the laboratory data generated by Gelman Sciences Ann Arbor, Michigan Environmental Laboratory facilities reported herein. All analyses performed by Gelman Science's Environmental Laboratory facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Gelman Science's Environmental group has reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

At the end of the month some of the 1,4-dioxane samples were sent to Ann Arbor Technical Services for analysis due to a reproducibility problem. The balance of the samples was analyzed for 1,4-dioxane at Gelman Science's Environmental Laboratory. All bromate samples were analyzed by Gelman Science's Environmental Laboratory. The test results in this report meet all NELAP requirements for parameters for which accreditation are required or available. Any exceptions to NELAP requirements are noted in this report. All exceptions are noted per laboratory standard operating procedure based on EPA Method 1624c. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results. The odd even rule is used for rounding. Holding times were met for all samples analyzed. Proper preservation was observed on all samples unless otherwise detailed in the individual sections below.

## RECEIPT/ STORAGE

The samples were received on the days noted in the report for the Month; the samples arrived in good condition, properly preserved and on ice when necessary. Samples that require 1,4-dioxane analysis are collected in hydrochloric HCl acid-preserved vials to a pH of ≤2, except for the Pall ozone treatment samples. These samples have chemicals that, when mixed with the HCl acid, cause interferences and trap damage. Every attempt is made to analyze these samples within 24 hours of receipt.

Samples that require Bromate analysis are collected and preserved in the laboratory with ethylene di-amine and refrigerated.

Samples that are delivered to the laboratory the same day as they are collected are likely not to have reached a fully chilled temperature. This is acceptable as long as there is evidence that chilling has begun. All samples are iced or refrigerated at 4°C (±2°C) from the time of collection until sample preparation or analysis.

## 1,4-Dioxane (GC-MS)

All ground water and treated water samples were analyzed for 1,4-Dioxane (GC-MS) in accordance with EPA 1624C, which has been modified to enhance detection limits. Samples that were diluted to bring them within the calibrated range of the instrument are noted with a "D" under the Qualifier Code section of the data report. Reporting limits were adjusted based on each dilution.

Reporting limit for undiluted samples is 1ppb (part per billion, micrograms per liter, µg/L). All quality control parameters were within the acceptance limits for reported samples unless indicated.

## **GELMAN Sciences Inc.**

## **Bromate (Ion Chromatography)**

All surface water and treated samples were analyzed for Bromate (Ion Chromatography) in accordance with EPA 300.1. Surrogates are added to all samples. All quality control parameters were within the acceptance limits with the balance of sample analyzed.

The reporting limit for treated samples is 5.0ppb and for surface samples is 2.0ppb.

## Qualifiers

## 1,4-Dioxane Qualifier Codes:

Qualifier Code	Description
nd:	The compound was analyzed for, but not detected at or above the detection limit indicated.
D:	Analyte value quantified from a dilution; reporting limit is raised to reflect dilution.
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve, reported as estimate
B:	The sample vials contained air bubbles larger than 5mm, which may affect compound results.
J:	The compound was positively identified; the associated numerical value is the approximate concentration.
M:	Matrix effects, sample required dilution.
R:	The reported value is unusable and rejected due to variance from quality control criteria.
V:	The reported value is considered estimated due to variance from quality control criteria.
H:	Sample was analyzed past 14-day hold time, but within 45 days.
0:	Samples analyzed in outside laboratory.
S:	Samples split with DEQ.

## **Bromate Qualifier Codes:**

Qualifier Code	Description								
nd:	The compound was analyzed but was not detected at or above the detection limit indicated.								
E:	The compound result is greater than the upper quantitation limit in the associated calibration curve.								
J:	The compound was positively identified; the associated numerical value is the approximate concentration.								
R:	The reported value is unusable and rejected due to variance from quality control criteria.								
V:	The reported value is considered estimated due to variance from quality control criteria.								
H:	Sample was analyzed past 28-day hold time								
Report Checked	by: Ray Woods								
Report Checked	by: Sheri Weintraub Date: 11/10/2021								

## GELMAN Sciences Inc.

## Sample Analysis Report

October, 2021

642 South Wagner Road Ann Arbor, MI 48103-9019 US 734.436.4025 phone

Analyst	Initials:	
	Date:	

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
Extraction Wells			=		3			
C3								
DOLPH-10-12-21-14:05-1	120	5						o,d
DOLPH-10-13-21-11:10-2					220	40		
DOLPH-10-13-21-11:10-1	120	10						o,d
TW-14-10-05-21-09:15-2					37	40		
TW-14-10-05-21-09:15-1	100	10						o,d
TW-14-10-14-21-11:00-2					84	40		
TW-14-10-14-21-11:00-1	110	5						o,d
TW-14-10-21-21-10:15-2					41	40		
TW-14-10-21-21-10:15-1	110	2						o,d
TW-14-10-28-21-10:30-2					56	20		
TW-14-10-28-21-10:30-1	110	4						o,d
TW-20-10-18-21-12:40-2					190	40		
TW-20-10-18-21-12:40-1	830	10						o,d
TW-20-10-26-21-10:45-2					130	20		
TW-20-10-26-21-10:45-1	720	10						o,d
TW-24-10-05-21-09:25-2					230	40		
TW-24-10-05-21-09:25-1	1900	40						o,d
TW-24-10-15-21-10:28-2					370	40		
TW-24-10-15-21-10:28-1	1800	40	4					o,d
TW-24-10-21-21-10:35-2					200	40		

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s
TW-24-10-21-21-10:35-1	1900	40						o,d
D2								
LB-1-10-26-21-10:30-2					220	20		
LB-1-10-26-21-10:30-1	290	10						o,d
LB-4-10-13-21-10:25-2					160	40		
LB-4-10-13-21-10:25-1	430	10						o,d
TW-21-10-13-21-10:55-2					110	40		
TW-21-10-13-21-10:55-1	240	10						o,d
TW-5-10-05-21-09:05-2		0			38	40		
TW-5-10-05-21-09:05-1	610	20						o,d
TW-5-10-14-21-10:50-2					100	40		
TW-5-10-14-21-10:50-1	590	40						o,d
TW-5-10-21-21-13:30-2					68	40		
TW-5-10-21-21-13:30-1	630	20						o,d
E		42						
TW-11-10-05-21-09:10-2					120	40		
TW-11-10-05-21-09:10-1	160	10						o,d
TW-11-10-14-21-10:55-2					170	40		
TW-11-10-14-21-10:55-1	160	10						o,d
TW-11-10-21-21-13:35-2					84	40		
TW-11-10-21-21-13:35-1	160	5		1				o,d
TW-17-10-05-21-09:20-2					68	40		
TW-17-10-05-21-09:20-1	100	10						o,d
TW-17-10-14-21-11:05-2					63	40		
TW-17-10-14-21-11:05-1	77	5		U.				o,d
TW-17-10-22-21-10:30-					47	40		
TW-17-10-22-21-10:30-1	77	5						o,d

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
TW-18-10-13-21-11:00-2					110	40		
TW-18-10-13-21-11:00-1	260	10						o,d
TW-23-10-13-21-10:30-2					230	40		
TW-23-10-13-21-10:30-1	380	10						o,d
TW-29-10-01-21-10:30-1	450	20						o,d
TW-29-TW-29-10-13-21-10:45-2					220	40		
TW-29-TW-29-10-13-21-10:45-1	290	10						o,d
Marshy	<del></del>	•						
PW-1-10-13-21-11:05-2					160	40		
PW-1-10-13-21-11:05-1	760	10						o,d
PW-1-10-26-21-10:40-2					150	20		
PW-1-10-26-21-10:40-1	640	10						o,d
sw	•							
TW-22-10-01-21-11:15-2				ē	4.6	40		
TW-22-10-01-21-11:15-1	450	10						o,d
TW-22-10-13-21-11:15-2					34	40		
TW-22-10-13-21-11:15-1	420	10						o,d
TW-22-10-21-21-10:25-2					6.4	40		
TW-22-10-21-21-10:25-1	400	10						o,d
TW-28-10-13-21-11:20-2					140	40		
TW-28-10-13-21-11:20-1	640	10						o,d
TW-28-10-21-21-10:30-2					89	40		
TW-28-10-21-21-10:30-1	490	10						o,d
Monitoring Wells								
C3								
MW-18d-10-11-21-13:00-1	56	1.0						o

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
MW-22-10-11-21-14:25-1	2100	100			2			o,d
MW-32-10-11-21-09:16-1	15	1.0			- •			o
MW-34s-10-08-21-10:16-1	nd	1.0			1			0
MW-35-10-07-21-11:30-1	2	1.0						0
MW-38s-10-08-21-11:38-1	nd	1.0						0
D0								
A2 Cleaning Supply-10-04-21-11:40-1	51	1.0						0
MW-53d-10-04-21-09:49-1	nd	1.0						0
MW-53i-10-04-21-12:37-1	38	1.0						0
MW-53s-10-04-21-11:11-1	nd	1.0						0
D2								
MW-107-10-14-21-14:10-1	530	20						o,d
MW-11d-10-07-21-14:20-1	260	10						o,d
MW-121s-10-29-21-11:14-1	nd	1.0	20					0
MW-129i-10-14-21-10:08-1	nd	1.0						0
MW-129s-10-14-21-11:18-1	nd	1.0						0
MW-34d-10-08-21-09:01-1	nd	1.0						0
MW-38d-10-08-21-12:50-1	41	1.0			Si Si			o
MW-4d-10-07-21-13:01-1	340	10						o,d
E				*				
MW-103s-10-05-21-13:44-1	82	1.0						o
MW-104-10-06-21-12:32-1	26	1.0						0
MW-110-10-06-21-13:50-1	120	10						o,d
MW-112i-10-05-21-11:45-1	9	1.0						0
MW-112s-10-05-21-10:36-1	3	1.0						0
MW-121d-10-29-21-12:23-1	nd	1.0						0

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
MW-129d-10-14-21-12:27-1	2	1.0						0
MW-64-10-11-21-10:59-1	42	1.0						0
MW-66-10-07-21-10:01-1	2	1.0						0
MW-76i-10-06-21-09:50-1	100	10						o,d
MW-76s-10-06-21-11:11-1	270	10					ē	o,d
MW-84s-10-04-21-14:05-1	500	10						o,d
SW								
MW-10d-10-12-21-13:31-1	120	10						o,d
MW-45d-10-12-21-10:53-1	760	10						o,d
MW-45s-10-12-21-09:40-1	6	10						0
MW-46-10-13-21-12:25-1	72	1.0						0
MW-48-10-13-21-09:11-1	15	1.0						o
MW-49-10-13-21-10:33-1	nd	1.0						О
MW-50-10-13-21-13:53-1	500	20						o,d
MW-52s-10-12-21-12:20-1	190	1.0						o,d
Surface Water								
Not Applicable								
HC/HR-10-01-21-10:10-1			nd	2.0				
HC/HR-10-04-21-10:20-1			nd	2.0				
HC/HR-10-05-21-09:45-1			nd	2.0				
HC/HR-10-06-21-09:20-1			nd	2.0				
HC/HR-10-07-21-09:55-1			nd	2.0			1	
HC/HR-10-08-21-09:30-1			nd	2.0				
HC/HR-10-11-21-09:25-1			nd	2.0				
HC/HR-10-12-21-09:50-1			nd	2.0				
HC/HR-10-13-21-10:10-1			nd	2.0				

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
HC/HR-10-14-21-10:10-1	(17)	G F -2	nd	2.0	(P) - 1			, , , , , , , , , , , , , , , , , , ,
HC/HR-10-15-21-09:10-1			nd	2.0				
HC/HR-10-18-21-10:25-1			nd	2.0				
HC/HR-10-19-21-09:15-1	15		nd	2.0				
HC/HR-10-20-21-09:45-1			nd	2.0				
HC/HR-10-21-21-10:05-1			nd	2.0				
HC/HR-10-22-21-10:00-1			nd	2.0				
HC/HR-10-25-21-09:05-1			nd	2.0				
HC/HR-10-26-21-10:00-1			nd	2.0				
HC/HR-10-27-21-09:45-1			nd	2.0				
HC/HR-10-28-21-10:00-1			nd	2.0				
HC/HR-10-29-21-12:00-1			nd	2.0				
Treatment System							-	
OUTFALL-10-03-21-2			7.0	5.0				
OUTFALL-10-03-21-1	6	1.0						0
OUTFALL-10-04-21-2			10	5.0				
OUTFALL-10-04-21-1	5	1.0						0
OUTFALL-10-05-21-2			8.4	5.0				
OUTFALL-10-05-21-1	5	1.0						О
OUTFALL-10-06-21-2			8.2	5.0				
OUTFALL-10-06-21-1	6	1.0						o
OUTFALL-10-07-21-2			8.4	5.0				
OUTFALL-10-07-21-1	6	1.0						o
OUTFALL-10-10-21-2			10	5.0				
OUTFALL-10-10-21-1	6	1.0						0
OUTFALL-10-11-21-2			12	5.0				
OUTFALL-10-11-21-1	6	1.0						0

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-10-12-21-2			11	5.0				
OUTFALL-10-12-21-1	5	1.0			a			0
OUTFALL-10-13-21-2			12	5.0				
OUTFALL-10-13-21-1	4	1.0						О
OUTFALL-10-14-21-2			12	5.0				
OUTFALL-10-14-21-1	5	1.0						0
OUTFALL-10-17-21-2			19	5.0				
OUTFALL-10-17-21-1	5	1.0						0
OUTFALL-10-18-21-2			14	5.0				
OUTFALL-10-18-21-1	7	1.0						0
OUTFALL-10-19-21-2			9.4	5.0				55.1 11
OUTFALL-10-19-21-1	8	1.0						0
OUTFALL-10-20-21-2			9.4	5.0				
OUTFALL-10-20-21-1	8	1.0						0
OUTFALL-10-21-21-2			8.9	5.0				
OUTFALL-10-21-21-1	7	1.0						0
OUTFALL-10-22-21-2			10	5.0				
OUTFALL-10-22-21-1	7	1.0						0
OUTFALL-10-23-21-2			10	5.0				
OUTFALL-10-23-21-1	6	1.0						0
OUTFALL-10-24-21-2			9.4	5.0				
OUTFALL-10-24-21-1	6	1.0						0
OUTFALL-10-25-21-2			9.3	5.0				
OUTFALL-10-25-21-1	6	1.0						o
OUTFALL-10-26-21-2			10	5.0				
OUTFALL-10-26-21-1	6	1.0						О
OUTFALL-10-27-21-2			7.7	5.0				

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
OUTFALL-10-27-21-1	6	1.0						О
OUTFALL-10-28-21-2			8.2	5.0				
OUTFALL-10-28-21-1	7	1.0						o
OUTFALL-10-29-21-2			9.4	5.0				
OUTFALL-10-29-21-1	7	1.0						0
OUTFALL-10-30-21-2			8.6	5.0				
OUTFALL-10-30-21-1	7	1.0						0
OUTFALL-10-31-21-2			8.2	5.0				
OUTFALL-10-31-21-1	6	1.0						0
Red Pond-10-04-21-06:25-2					130	40		
Red Pond-10-04-21-06:25-1	390	10						o,d
Red Pond-10-11-21-07:20-1	400	20						o,d
Red Pond-10-12-21-07:15-2					150	20		
Red Pond-10-12-21-07:15-1	390	40						o,d
Red Pond-10-13-21-07:25-2					140	20		
Red Pond-10-13-21-07:25-1	390	40						o,d
Red Pond-10-14-21-07:25-1	360	40						o,d
Red Pond-10-14-21-07:25-2	360	40						o,d
Red Pond-10-15-21-08:00-2					140	40		
Red Pond-10-15-21-08:00-1	330	40						o,d
Red Pond-10-18-21-07:10-2					150	40		
Red Pond-10-18-21-07:10-1	430	40						o,d
Red Pond-10-19-21-07:05-2					130	20		
Red Pond-10-19-21-07:05-1	410	40						o,d
Red Pond-10-20-21-07:00-1	400	40						o,d
Red Pond-10-21-21-07:20-1	390	40						0
Red Pond-10-22-21-07:05-2					160	20		

Sample Name - Date/Time Sampled	1,4-Dioxane Results (ppb)	R.L. (ppb)	Bromate Results (ppb)	R.L. (ppb)	Bromide Results (ppb)	R.L. (ppb)	Comments	Qualifier(s)
Red Pond-10-22-21-07:05-1	350	40						o,d
Red Pond-10-25-21-07:15-2					130	20		
Red Pond-10-25-21-07:15-1	320	40						o,d
Red Pond-10-26-21-07:10-2					140	20		
Red Pond-10-26-21-07:10-1	260	40						o,d
Red Pond-10-27-21-05:50-2				3	41	20		
Red Pond-10-27-21-05:50-1	340	40						o,d
Red Pond-10-28-21-07:15-2					77	20		
Red Pond-10-28-21-07:15-1	320	40						o,d
Red Pond-10-29-21-07:15-2					84	20		
Red Pond-10-29-21-07:15-1	200	40						o,d

## **Data Transmittal Cover Page**

**Project Name:** Pall Corporation

ATS Project Number: G001-002

ATS Report Number(s): Inorg\_SRF\_Oct\_PO3225

**Client PO Number: 4504963225** 

Project Description: This data report contains the results of 101 water samples, received by ATS during

the months of October and November, to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratories, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

Recipient:	Mr. Gage Trendel		Email: FAX Number:	gtrendel@fv-operations.com	
No. of Page	es (including cover pg.):	193	TAX Number.		
From:	Sarah Stubblefield Senior Chemist / Lab Manager	Email: FAX Number:		eld@AnnArborTechnicalServices.com	
Additional	Message:				
Date:	11/5/21	Signed:	34.98		

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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1021211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1021211 Client PO Number: 4504963225** 

## **Case Narrative Summary**

This case narrative applies to the following 14 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/21/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/21/21				
Outfall 001	10/20/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/21/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/21/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/21/21	Urgent	1,4-Dioxane	Water
BP-1	10/21/21	Urgent	1,4-Dioxane	Water
OF-Grab	10/21/21	Urgent	1,4-Dioxane	Water
OF-Test	10/21/21	Urgent	1,4-Dioxane	Water
Red Pond	10/21/21	Urgent	1,4-Dioxane	Water
MW-142 (155-160)	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (145-150)	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (170-180)	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (190-195')	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (200-205')	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (210-215')	10/20/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

### Number of Samples

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

• 14 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

- The following samples were received un-preserved and analyzed at native pH.
  - o MW-142 (145-150') 10/20/21

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

### **Analytical QA/QC Summary**

## Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None

## **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None

## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/21/21

Mouldliking

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Outfall 001	Analysis Date	10/21/2021
Laboratory Sample ID	Outfall 001 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Comb Eff	Analysis Date	10/21/2021
Laboratory Sample ID	Comb Eff 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/21/2021
Laboratory Sample ID	Eff-OC-1A 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/21/2021
Laboratory Sample ID	Eff-OC-2A 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.010	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	BP-1	Analysis Date	10/21/2021
Laboratory Sample ID	BP-1 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Outfall Grab	Analysis Date	10/21/2021
Laboratory Sample ID	Outfall Grab 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Outfall Test	Analysis Date	10/21/2021
Laboratory Sample ID	Outfall Test 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	Red Pond	Analysis Date	10/21/2021
Laboratory Sample ID	Red Pond 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.39	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (155-160')	Analysis Date	10/21/2021
Laboratory Sample ID	MW-142 (155-160') 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (145-150')	Analysis Date	10/21/2021
Laboratory Sample ID	MW-142 (145-150') 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (175-180')	Analysis Date	10/21/2021
Laboratory Sample ID	MW-142 (175-180') 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (190-195')	Analysis Date	10/22/2021
Laboratory Sample ID	MW-142 (190-195') 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (200-205')	Analysis Date	10/22/2021
Laboratory Sample ID	MW-142 (200-205') 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1021211	Preparation Date	10/21/2021
Client Sample ID	MW-142 (210-215')	Analysis Date	10/22/2021
Laboratory Sample ID	MW-142 (210-215') 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1021211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1021211

 SDG
 1021211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
100 11000101	10/01/0001	10.50.00	4.4.50	100.04.4			111	2 224		

LRB-1 10/21/21 10/21/2021 10:52:02 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1021211

SDG 1021211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/21/21	10/21/2021	10:08:04	1,4-Dioxane	123-91-1		0.010	0.0098	mg/L	Wet	97.6	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1021211

 SDG
 1021211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102121 MS	10/21/2021	18:23:05	1,4-Dioxane	123-91-1	0.39	0.40	0.84	mg/L	Wet	112	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1021211

 SDG
 1021211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102121 MSD	10/21/2021	19:07:00	1,4-Dioxane	123-91-1	0.39	0.40	0.82	mg/L	Wet	107	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1021211

SDG 1021211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
F	Red Pond 102121 MS	10/21/2021	18:23:05	1,4-Dioxane	123-91-1	0.84		mg/L	Wet			
F	Red Pond 102121 MSD	10/21/2021	19:07:00	1,4-Dioxane	123-91-1	0.82	0.83	mg/L	Wet	2.0	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/095-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

المحاسبة

PROJECT ID / NUMBER	LABORATORY INFORMATION		SHIPPING	NFORM	IATION: SHIPI	PER (Check one) / Tr	RACKING NUM	BER(S) (If applicable	······································	
SAMPLE CUSTODIAN (Print a Signature)	PO\$4504963	225	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
SAMPLE CUSTODIAN (Print & Signature)			Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
Good Trendel Gas	12 Trevolet @ Pa	ill.com	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
Cage			Date		Fed Ex	UPS	DHL	Courler	Tracking Number	
RELINQUISHED BY (Print & Signature)	DATE / TIME RECEIVED BY	rini & Signaluco)	DATE	/ TIME	RELINQUISH	D BY (Print & Signature)		DATE/TIME F	RECEIVED BY (Print & Signalure)	DATE / TIME
Gage Trendel	10/21/21							Lange Labour.		
RELINQUISHED (Y (Print & Signature)	DATE / TIME RECEIVED BY (	Print & Signature)	DATE	/TIME	RELINQUISH	D BY (Print & Signature)		DATE / TIME F	RECEIVED BY (Print & Signature)	DATE / TIME
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45 day hold thre sox	All others SHCI	preserved		ER	3					MATRIX
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O Z			NO. OF CONTAINERS	ו אנוא	Ď.					Sediment/Sludge Extract
O DATE	COMP.	AMPLE IDENTIFICATION	NO. O	PRIO	エ					
1. Outfall 10/20/2	X	rgent	è		1					
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290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734995-0995 Fax. 734995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

								[03	1/212
POJECT ID / NUMBER  PALL Scmiles  SAMPLE CUSTODIAN (Print & Signalure)  Mitch Domins St  RELINQUISHED BY (Print & Signalure)  RELINQUISHED BY (Print & Signalure)	LABORATORY INFORMATION  As a lifally 69/31	SHIPPING I	INFORMA	TION: SHIPP	ER (Check one) / TRA	CKING NUMI	SER(S) (If applicab	ie)	
ALL SCHOLLES	170 # 4509 15 16 11	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
A A A A A A A A A A A A A A A A A A A		Date	_	Fed Ex	UPS	DHL	Courier	Tracking Number	
Mitch Dominichi IVI 148	522 18595	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
RELINQUISHED BY (Print & Signature)	DATE / TIME   RECEIVED BY (Print & Signature)	Date DATE / 1		Fed Ex ELINQUISHE	D BY (Print & Signature)	DHL	DATE / TIME	RECEIVED BY (Print & Signature)	DATE / TIME
11	10/21/21								
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COMMENTS (Preservation, etc.)									
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BAR CODE DATE	TIME 8 6 SAMPLE IDENTIFICATION	2 2	<u>g.</u>	7		-			L/D
1. 10/21/31	915 X /1W-142 (190-195) 1140 X MW-142 (200-205) 1400 X MW-142 (210-215)	1		2					<del></del>
2.	1140 1 NW-192 1200-2051	(2)		X					410
3. 10/21/21	TIME & S SAMPLE IDENTIFICATION  915 X MW-142 (190-195)  1140 X MW-142 (200-205)  1400 X MW-142 (210-215)	2		X	_				410
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1022211** 

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1022211 Client PO Number: 4504963225** 

#### **Case Narrative Summary**

This case narrative applies to the following 14 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/22/21, and associated matrix-specific QA/QC:

#### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/22/21				
Outfall 001	10/21/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/22/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/22/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/22/21	Urgent	1,4-Dioxane	Water
BP-1	10/22/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/22/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/22/21	Urgent	1,4-Dioxane	Water
Red Pond	10/22/21	Urgent	1,4-Dioxane	Water
TW-14	10/21/21	Standard	1,4-Dioxane	Water
TW-24	10/21/21	Standard	1,4-Dioxane	Water
TW-28	10/21/21	Standard	1,4-Dioxane	Water
TW-22	10/21/21	Standard	1,4-Dioxane	Water
TW-5	10/21/21	Standard	1,4-Dioxane	Water
TW-11	10/21/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

#### **Analysis**

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

#### Number of Samples

- 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 6 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

None

#### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

#### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

### **Analytical QA/QC Summary**

#### **Calibration Verification**

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

#### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None



#### **QA/QC Batch Summary**

#### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

#### <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

#### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

- TW-24 10/21/21
- TW-14 10/21/21
- TW-28 10/21/21
- TW-22 10/21/21
- TW-5 10/21/21
- TW-11 10/21/21
- Red Pond 10/22/21

Mark allong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Outfall 001	Analysis Date	10/22/2021
Laboratory Sample ID	Outfall 001 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731

#### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Comb Eff	Analysis Date	10/22/2021
Laboratory Sample ID	Comb Eff 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/22/2021
Laboratory Sample ID	Eff-OC-1A 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/22/2021
Laboratory Sample ID	Eff-OC-2A 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.010	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	BP-1	Analysis Date	10/22/2021
Laboratory Sample ID	BP-1 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Outfall Grab	Analysis Date	10/22/2021
Laboratory Sample ID	Outfall Grab 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Outfall Test	Analysis Date	10/22/2021
Laboratory Sample ID	Outfall Test 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	Red Pond	Analysis Date	10/22/2021
Laboratory Sample ID	Red Pond 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.35	0.04		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-14	Analysis Date	10/23/2021
Laboratory Sample ID	TW-14 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	2
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.11	0.002		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-24	Analysis Date	10/23/2021
Laboratory Sample ID	TW-24 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	1.9	0.04		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-28	Analysis Date	10/23/2021
Laboratory Sample ID	TW-28 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.49	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-22	Analysis Date	10/23/2021
Laboratory Sample ID	TW-22 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.40	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-5	Analysis Date	10/23/2021
Laboratory Sample ID	TW-5 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	USEPA 1624 Basis	
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.63	0.02		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1022211	Preparation Date	10/22/2021
Client Sample ID	TW-11	Analysis Date	10/23/2021
Laboratory Sample ID	TW-11 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	5
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1022211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.16	0.005		М

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Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1022211

 SDG
 1022211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
LDD 4.40/00/04	40/00/0004	44.04.00	4.4.6:	100.01.1			14/ /	0.004		

LRB-1 10/22/21 10/22/2021 11:24:28 1,4-Dioxane 123-91-1 mg/L Wet 0.001

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1022211

SDG 1022211 Project Number: G001-002.21 Report Date: 11/4/2021

#### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/22/21	10/22/2021	12:22:45	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	109	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1022211

 SDG
 1022211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102221 MS	10/22/2021	22:40:02	1,4-Dioxane	123-91-1	0.35	0.40	0.79	mg/L	Wet	109	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1022211

 SDG
 1022211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102221 MSD	10/22/2021	23:23:52	1,4-Dioxane	123-91-1	0.35	0.40	0.78	mg/L	Wet	106	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1022211

 SDG
 1022211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
R	Red Pond 102221 MS	10/22/2021	22:40:02	1,4-Dioxane	123-91-1	0.79		mg/L	Wet			
R	Red Pond 102221 MSD	10/22/2021	23:23:52	1,4-Dioxane	123-91-1	0.78	0.78	mg/L	Wet	1.2	20	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-3995 Fax. 734/995-3731 Michigan Laboratory ID: 9804 Wisconaln Laboratory ID: 998321720

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3 Duffell   10/21/2   10/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/21/2   17/21/2   16/2			1	$\neg$ $\top$		A P P	N YE	ã							
1 Outfell 10 21 7 7:16 2 Comb Af. 10 21 7 7:16 3 EACC-1A 10 27 7 7:16 4 EAC-CC-1A 10 27 7 7:26 5 BP 1 10 27 7 7:25 5 ATELL-GRA 10 22 7 7:35 7 Outfell Test 10 22 7 7:35 8 Rod Pona 10 22 7 7:05 9 TW-24 10 21 7 10:15 11 TW-24 10 21 7 10:35 12 TW-27 10 21 7 10:25 13 TW-5 10 21 7 10:25 14 TW-11 10 21 7 10:25 15 16	BAR CODE	DATE	TIME	SPAB	SAMPLE IDENTIFICATION	NO. O	PRIOR	2-							
2 Cambo Aff. bi2/17 7:16 2 Eff-CC-1A bi2/2/17:20 4 Eff-CC-1A bi2/2/17:20 5 BP-1 bi2/2/17:25 5 CAHELL-Grab bi7/2/2 7:35 6 CAHELL-Test bi2/2/17:35 6 Rad Ponce bi2/2/17:35 6 TW-14 bi2/2/17:35 11 TW-24 bi2/2/17:35 12 TW-22 bi2/2/17:35 13 TW-5 bi2/2/2 13:35 14 TW-1 bi2/2/2 13:35 15 TW-1 bi2/2/2 13:35 16 TW-1 bi2/2/2 13:35						1		ì							
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4. FAT-CC-2A 10122/21 7:26 6. BP 1 1012121 7:25 6. Attell-Grach 1012121 7:30 7. Octtell-Test 1012121 7:35 8. Roal Ponce 1012121 10:15 10. TJ-ZL 1012121 10:25 11. TJ-ZL 1012121 10:25 11. TJ-ZL 1012121 13:30 11. TJ-S 1012121 13:30 11. TJ-S 1012121 13:35	3. EAT-CC-IA	1-1-1-													
5. BP 1 10/22/21 7:25  6. Oxtfell-Grain 10/22/21 7:35  7. Oxtfell-Test 10/22/21 7:35  8. Roal Pond 10/22/21 7:05  9. Tij-14 10/21/21 10/35  11. Tij-74/1 10/21/21 10/25  12. Tij-22 10/21/21 10/25  13. Tij-5 10/21/21 13/30  14. Tij-16 10/21/21 13/36  15. 16. 17.	4. EAC-CC-ZA														
6. Natfell-Grab 10/21/2 7:35  7. Octfell-Test 10/21/2 7:35  6. Rool Panal 10/21/2 10:15  10. TW-14 10/21/2 10:35  11. TW-24 10/21/2 10:25  12. TW-22 10/21/2 10:25  13. TW-5 10/21/2 13:35  14. TW-11 10/21/2 13:35  15. 16. 17.		- ·- /	1 1												
7. Octfell Test   bizzlz: 7:35		10/72/21	7:30												
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9 TJ-14		_ , ,				The state of the s									
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12. TW-27   10/2/17   10:25 13. TW-5   10/2/2   13:30 14. TW-11   10/2/2   13:35 15.   16.   17.   19.	11. 11.)-7 </td <td></td>														
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1025211** 

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1025211 Client PO Number: 4504963225** 

#### **Case Narrative Summary**

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/25/21, and associated matrix-specific QA/QC:

#### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/25/21				
Outfall 001	10/22/21	Urgent	1,4-Dioxane	Water
Outfall 001	10/23/21	Urgent	1,4-Dioxane	Water
Outfall 001	10/24/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/25/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/25/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/25/21	Urgent	1,4-Dioxane	Water
BP-1	10/25/21	Urgent	1,4-Dioxane	Water
Grab OF	10/25/21	Urgent	1,4-Dioxane	Water
OF Test	10/25/21	Urgent	1,4-Dioxane	Water
Red Pond	10/25/21	Urgent	1,4-Dioxane	Water
TW-17	10/21/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

#### **Analysis**

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 10 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 1 Samples

#### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

G001-002.21/CN\_1025211.doc

#### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

#### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### Analytical QA/QC Summary

#### **Calibration Verification**

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

#### <u>Instrument Blanks</u>

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

#### **QA/QC Batch Summary**

#### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None



### **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None

#### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/25/21

• TW-17 10/21/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Tock Westong

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Outfall 001	Analysis Date	10/25/2021
Laboratory Sample ID	Outfall 001 102221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/22/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731

#### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Outfall 001	Analysis Date	10/25/2021
Laboratory Sample ID	Outfall 001 102321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/23/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Outfall 001	Analysis Date	10/25/2021
Laboratory Sample ID	Outfall 001 102421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/24/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Comb Eff	Analysis Date	10/25/2021
Laboratory Sample ID	Comb Eff 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/25/2021
Laboratory Sample ID	Eff-OC-1A 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.004	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/25/2021
Laboratory Sample ID	Eff-OC-2A 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	BP-1	Analysis Date	10/25/2021
Laboratory Sample ID	BP-1 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Outfall Grab	Analysis Date	10/25/2021
Laboratory Sample ID	Outfall Grab 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Outfall Test	Analysis Date	10/25/2021
Laboratory Sample ID	Outfall Test 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	Red Pond	Analysis Date	10/25/2021
Laboratory Sample ID	Red Pond 102521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/25/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.33	0.04		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1025211	Preparation Date	10/25/2021
Client Sample ID	TW-17	Analysis Date	10/25/2021
Laboratory Sample ID	TW-17 102121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/21/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	5
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1025211	Units	mg/L

_	Chemical			DOL	
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.077	0.005		М

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1025211

 SDG
 1025211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID Analysis Date Analysis Time Chemical Name CAS Result Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
LPR 1.10/25/21 10/25/2021 11:42:00 1.4 Diayana 122.01.1 mg/l	\A/ot		The permit of th	

LRB-1 10/25/21 10/25/2021 11:43:09 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1025211

SDG 1025211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/25/21	10/25/2021	10:59:19	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	109	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1025211

 SDG
 1025211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102521 MS	10/25/2021	21:05:32	1,4-Dioxane	123-91-1	0.32	0.40	0.71	mg/L	Wet	97.7	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1025211

 SDG
 1025211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102521 MSD	10/25/2021	21:49:16	1,4-Dioxane	123-91-1	0.32	0.40	0.76	mg/L	Wet	110	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY**

Method: **USEPA 1624** QA/QC Batch Number: QCORG1025211

SDG 1025211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 102521 MS	10/25/2021	21:05:32	1,4-Dioxane	123-91-1	0.71		mg/L	Wet			
Red Pond 102521 MSD	10/25/2021	21:49:16	1,4-Dioxane	123-91-1	0.76	0.73	mg/L	Wet	6.5	20	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.



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	$\sim$			11201	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
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COMMENTS (Preservation, etc.)		11:04	=	-> upreseived	-			<del></del>		ANALYSIS		
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Caye Truelol  COMMENTS (Preservation, etc.)  Surples needled by 1115  45 day hold time > 010		ril oto	مدوج	s DHCI proserved	ERS	PRIORITY NUMBER	14-Dioxona					MATRIX Indicate Soil/Water/Air Sediment/Sludge
O BAR CODE			<del>б</del> . в		NO. OF CONTAINERS	TINC	0					Extract
BAR CODE	DATE	TIME	COMP.	SAMPLE IDENTIFICATION	8 8	PRIC	芝					
1. Outfall	10/22/21			Urgent			<u> </u>					
2 Out-Call	10/23/21			Y	1							
3. Outfall	10/23/21		$\sqrt{}$				-					
4 Comb EAC		7:20	J	/	1							
5. EAP-OC-1A	10/25/21	1	/									
6. EFF-CC-ZA	10/25/71	I i					a de la constantina della cons					
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1026211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1026211 Client PO Number: 4504963225** 

## **Case Narrative Summary**

This case narrative applies to the following eight samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/26/21, and associated matrix-specific QA/QC:

### **Samples**

Jampies				
Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/26/21				
Outfall 001	10/25/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/26/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/26/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/26/21	Urgent	1,4-Dioxane	Water
BP-1	10/26/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/26/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/26/21	Urgent	1,4-Dioxane	Water
Red Pond	10/26/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

<u>Analysis</u> <u>Number of Samples</u>

1,4-Dioxane (USEPA 1624) – Urgent TAT 

• 8 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

## **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None



## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/26/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)





G001-002.21	Percent Moisture	100
1026211	Preparation Date	10/26/2021
Outfall 001	Analysis Date	10/26/2021
Outfall 001 102521	Instrument	2100V
Water	Subsample (mL)	5
10/25/2021	Final Volume (mL)	5
USEPA 1624	Dilution Factor	1
USEPA 1624	Basis	Wet
QCORG1026211	Units	mg/L
	1026211 Outfall 001 Outfall 001 102521 Water 10/25/2021 USEPA 1624 USEPA 1624	1026211   Preparation Date

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Comb Eff	Analysis Date	10/26/2021
Laboratory Sample ID	Comb Eff 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovana	123-01-1	ດ ດດໂ	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/26/2021
Laboratory Sample ID	Eff-OC-1A 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioyane	123-91-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/26/2021
Laboratory Sample ID	Eff-OC-2A 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioyana	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	BP-1	Analysis Date	10/26/2021
Laboratory Sample ID	BP-1 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.006	0.001		

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Outfall Grab	Analysis Date	10/26/2021
Laboratory Sample ID	Outfall Grab 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Outfall Test	Analysis Date	10/26/2021
Laboratory Sample ID	Outfall Test 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1026211	Preparation Date	10/26/2021
Client Sample ID	Red Pond	Analysis Date	10/26/2021
Laboratory Sample ID	Red Pond 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1026211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.GÎ			

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1026211

 SDG
 1026211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID Analysis	ate Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
1.00.4.4.0/00/04	4 05 00 44	1.1.D.	100.04.4			10/-4	2.224	. 0	

LRB-1 10/26/201 10/26/2021 05:06:14 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1026211

SDG 1026211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/26/21	10/26/2021	04:22:35	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	105	85	115	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1026211

SDG 1026211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1026211 MS	10/26/2021	05:49:58	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	108	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1026211

 SDG
 1026211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1026211 MSD	10/26/2021	06:33:43	1,4-Dioxane	123-91-1		0.010	0.0098	mg/L	Wet	97.8	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY**

Method: **USEPA 1624** QA/QC Batch Number: QCORG1026211

SDG 1026211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 1026211 MS	10/26/2021	05:49:58	1,4-Dioxane	123-91-1	0.011		mg/L	Wet			
ATS Tap Water	10/26/2021	06:33:43	1,4-Dioxane	123-91-1	0.0098	0.010	mg/L	Wet	10	20	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9804 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER LABORATORY INFORMATION					SHIPPING INFORMATION: SHIPPER (Check one) / TRACKING NUMBER(S) (If applicable)								
SAMPLE CUSTODIAN (Pdot & Signature)		PO#	- 41	504963225	Date	-	Fed Ex	UPS UPS	DHL	Courier	Tracking Number		
SAMPLE CUSTODIAN (Print & Signature)					Date		Fed Ex	UPS	DHL	Courier	Tracking Number		
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0.092					Date		Fed Ex	UPS	DHL	Courier	Tracking Number		
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RELINQUISHED BY April & Signature)		DATE / T	ME	RECEIVED BY (Print & Signature)	DATE	TIME	RELINQUISH	ED BY (Print & Signature)		DATE / TIME	RECEIVED BY (Print & Signature)	DATE / TIME	
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COMMENTS (Preservation, etc.)		12000	۔ ۱۲ صک	ed except						NALYSIS			
75 and was 1 1 741a	~	0.4.0	Rod	I Pando Hel Doros		BER	03					MATRIX	
Sample Weedled ic 2-in				A TO STORY	SE SE	NUM	3					Indicate Soll/Water/Air Sediment/Studge	
O BAR CODE			<u>a</u> a		NO. OF CONTAINERS	PRIORITY NUMBER	14-Dicking					Extract	
BAR CODE	DATE	TIME	COMP		8 8 8	PRK	=						
1. Ortfall	10/25/21		1	Urgent	i		i						
2 EFF-COMB	Wizi1Z	7:15	=				100						
3. Eff-CC-IA	10/20,17	7:20	.	<u> </u>	The state of the s		of the latest section						
4 EPT-OC-ZA	10/20/21	7 20							_				
5. JP-(	iciZ(dZI												
6. Outfall-Gran		7:36	,				E STATE OF THE STA						
7. Outfall - Test		7:35			-								
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20.													



# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1027211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1027211 Client PO Number: 4504963225** 

## **Case Narrative Summary**

This case narrative applies to the following 17 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/27/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/27/21				
Outfall 001	10/26/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/27/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/27/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/27/21	Urgent	1,4-Dioxane	Water
BP-1	10/27/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/27/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/27/21	Urgent	1,4-Dioxane	Water
Red Pond	10/27/21	Urgent	1,4-Dioxane	Water
MW-143 (33-37)	10/26/21	Urgent	1,4-Dioxane	Water
MW-143 (41-45)	10/26/21	Urgent	1,4-Dioxane	Water
MW-143 (47-52)	10/26/21	Urgent	1,4-Dioxane	Water
MW-143 (57-62)	10/26/21	Urgent	1,4-Dioxane	Water
MW-143 (67-72)	10/26/21	Urgent	1,4-Dioxane	Water
MW-143 (77-82)	10/26/21	Urgent	1,4-Dioxane	Water
TW-20	10/26/21	Standard	1,4-Dioxane	Water
PW-1	10/26/21	Standard	1,4-Dioxane	Water
LB-1	10/26/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

## Number of Samples

- 14 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 3 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

- The following samples were received un-preserved and analyzed at native pH.
  - o MW-143 (33-37') 10/26/21
  - o MW-143 (41-45') 10/26/21

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

<u>1,4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None



## **QA/QC Batch Summary**

## **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

## Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/27/21

• TW-20 10/26/21

• PW-1 10/26/21

• LB-1 10/26/21

Mockalatong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Outfall 001	Analysis Date	10/27/2021
Laboratory Sample ID	Outfall 001 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical					
Parameter	Identifier	Result	MDL	PQL	Qual	
1.4-Dioyane	123-01-1	0.006	0.001			

Comments

Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Comb Eff	Analysis Date	10/27/2021
Laboratory Sample ID	Comb Eff 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/27/2021
Laboratory Sample ID	Eff-OC-2A 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/27/2021
Laboratory Sample ID	Eff-OC-1A 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	BP-1	Analysis Date	10/27/2021
Laboratory Sample ID	BP-1 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Outfall Grab	Analysis Date	10/27/2021
Laboratory Sample ID	Outfall Grab 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Outfall Test	Analysis Date	10/27/2021
Laboratory Sample ID	Outfall Test 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	Red Pond	Analysis Date	10/27/2021
Laboratory Sample ID	Red Pond 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.34	0.04		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (33'-37')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (33'-37') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (41'-45')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (41'-45') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (47'-52')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (47'-52') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (57'-62')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (57'-62') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (67'-72')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (67'-72') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	MW-143 (77'-82')	Analysis Date	10/27/2021
Laboratory Sample ID	MW-143 (77'-82') 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	TW-20	Analysis Date	10/28/2021
Laboratory Sample ID	TW-20 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.72	0.01		М

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	PW-1	Analysis Date	10/28/2021
Laboratory Sample ID	PW-1 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.64	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1027211	Preparation Date	10/27/2021
Client Sample ID	LB-1	Analysis Date	10/28/2021
Laboratory Sample ID	LB-1 102621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/26/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1027211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.29	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

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# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1027211

 SDG
 1027211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
LDD 4.40/07/04	40/07/0004	40.04.00	4.4 Diamana	400.04.4		//	101.	0.004		

LRB-1 10/27/21 10/27/2021 10:24:20 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1027211

SDG 1027211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/27/21	10/27/2021	09:40:23	1,4-Dioxane	123-91-1		0.010	0.0091	mg/L	Wet	91.4	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1027211

SDG 1027211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102721 MS	10/27/2021	22:58:47	1,4-Dioxane	123-91-1	0.34	0.40	0.76	mg/L	Wet	105	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1027211

 SDG
 1027211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102721 MSD	10/27/2021	23:42:38	1,4-Dioxane	123-91-1	0.34	0.40	0.80	mg/L	Wet	113	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY**

Method: **USEPA 1624** QA/QC Batch Number: QCORG1027211

SDG 1027211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 102721 MS	10/27/2021	22:58:47	1,4-Dioxane	123-91-1	0.76		mg/L	Wet			
Red Pond 102721 MSD	10/27/2021	23:42:38	1,4-Dioxane	123-91-1	0.80	0.78	mg/L	Wet	4.3	20	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax, 734/995-3731 Michigan Laboratory ID: 9804 Wisconsin Laboratory ID: 998321720

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	DATE	1	GRAB	SAMPLE IDENTIFICATION	58	<u> </u>				-	_		
1. Outfall	10/24/21		4	Urgent						<u> </u>			
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3. Fff-OC-ZA	WIZIZI	6:00	11										
4 Eff-OC-1A	Water	6:00											
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6. Outfell-Grabs	10/21/21	C:10	14	2 356 30 30 30 30 30 30 30 30 30 30 30 30 30 3									
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10. (41-45)	10/26/21		1										
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1028211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1028211 Client PO Number: 4504963225** 

## **Case Narrative Summary**

This case narrative applies to the following 13 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/28/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/28/21				
Outfall 001	10/27/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/28/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/28/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/28/21	Urgent	1,4-Dioxane	Water
BP-1	10/28/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/28/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/28/21	Urgent	1,4-Dioxane	Water
Red Pond	10/28/21	Urgent	1,4-Dioxane	Water
MW-143 (33-37)	10/27/21	Urgent	1,4-Dioxane	Water
MW-143 (41-45)	10/27/21	Urgent	1,4-Dioxane	Water
MW-143 (47-52)	10/27/21	Urgent	1,4-Dioxane	Water
MW-143 (57-62)	10/27/21	Urgent	1,4-Dioxane	Water
MW-143 (67-72)	10/27/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysi

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

### Number of Samples

• 13 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

None

## **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

## **Analytical QA/QC Summary**

## Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None



## **QA/QC Batch Summary**

## **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

## <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/28/21

expering

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Outfall 001	Analysis Date	10/28/2021
Laboratory Sample ID	Outfall 001 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Comb Eff	Analysis Date	10/28/2021
Laboratory Sample ID	Comb Eff 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/28/2021
Laboratory Sample ID	Eff-OC-1A 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/28/2021
Laboratory Sample ID	Eff-OC-2A 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.007	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	BP-1	Analysis Date	10/28/2021
Laboratory Sample ID	BP-1 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Outfall Grab	Analysis Date	10/28/2021
Laboratory Sample ID	Outfall Grab 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Outfall Test	Analysis Date	10/28/2021
Laboratory Sample ID	Outfall Test 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	Red Pond	Analysis Date	10/28/2021
Laboratory Sample ID	Red Pond 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.32	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	MW-143 (87'-92')	Analysis Date	10/28/2021
Laboratory Sample ID	MW-143 (87'-92') 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	MW-143 (97'-102')	Analysis Date	10/28/2021
Laboratory Sample ID	MW-143 (97'-102') 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	ND	0.001		U

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	MW-143 (107'-112')	Analysis Date	10/28/2021
Laboratory Sample ID	MW-143 (107'-112') 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	MW-143 (117'-122')	Analysis Date	10/28/2021
Laboratory Sample ID	MW-143 (117'-122') 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1028211	Preparation Date	10/28/2021
Client Sample ID	MW-143 (127'-132')	Analysis Date	10/28/2021
Laboratory Sample ID	MW-143 (127'-132') 102721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/27/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1028211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1028211

 SDG
 1028211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 4 40/00/04	40/00/0004	05.00.04	4.4.D'	100.01.1			101-4	0.004		

LRB-1 10/28/21 10/28/2021 05:33:01 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1028211

SDG 1028211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/28/21	10/28/2021	04:49:10	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	110	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1028211

 SDG
 1028211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102821 MS	10/28/2021	20:53:12	1,4-Dioxane	123-91-1	0.32	0.40	0.73	mg/L	Wet	102	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1028211

 SDG
 1028211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102821 MSD	10/28/2021	21:37:08	1,4-Dioxane	123-91-1	0.32	0.40	0.66	mg/L	Wet	87.0	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1028211

SDG 1028211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 102821 MS	10/28/2021	20:53:12	1,4-Dioxane	123-91-1	0.73		mg/L	Wet			
Red Pond 102821 MSD	10/28/2021	21:37:08	1,4-Dioxane	123-91-1	0.66	0.69	mg/L	Wet	8.8	20	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.



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PROJECT ID / NUMBER	1	ABORATORY INF	ORMATION	NIO ( 3772 S	SHIPPING	INFORM	MATION: SHIPI	PER (Check one) / TR	ACKING NUM	IBER(S) (If applicab	le)	
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	0		1	10011 1	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1029211

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1029211 Client PO Number: 4504963225** 

## **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/29/21, and associated matrix-specific QA/QC:

### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/29/21				
Outfall 001	10/28/21	Urgent	1,4-Dioxane	Water
Red Pond	10/29/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/29/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/29/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/29/21	Urgent	1,4-Dioxane	Water
BP-1	10/29/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/29/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/29/21	Urgent	1,4-Dioxane	Water
MW-143 (137-142')	10/28/21	Urgent	1,4-Dioxane	Water
MW-143 (157-162')	10/28/21	Urgent	1,4-Dioxane	Water
MW-143 (167-172')	10/28/21	Urgent	1,4-Dioxane	Water
TW-20	10/28/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

• 1,4-Dioxane (USEPA 1624) – Standard TAT

### Number of Samples

- 11 Samples
- 1 Sample

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None



### **QA/QC Batch Summary**

## **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

## <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/29/21

• TW-14 10/28/21

Mockalling

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Outfall 001	Analysis Date	10/29/2021
Laboratory Sample ID	Outfall 001 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L
	-		

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.007	0.001	·	

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### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Red Pond	Analysis Date	10/29/2021
Laboratory Sample ID	Red Pond 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1				

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Comb Eff	Analysis Date	10/29/2021
Laboratory Sample ID	Comb Eff 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/29/2021
Laboratory Sample ID	Eff-OC-1A 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/29/2021
Laboratory Sample ID	Eff-OC-2A 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.008	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	BP-1	Analysis Date	10/29/2021
Laboratory Sample ID	BP-1 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Outfall Grab	Analysis Date	10/29/2021
Laboratory Sample ID	Outfall Grab 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	Outfall Test	Analysis Date	10/29/2021
Laboratory Sample ID	Outfall Test 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	MW-143 (137'-142')	Analysis Date	10/29/2021
Laboratory Sample ID	MW-143 (137'-142') 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	MW-143 (157'-162')	Analysis Date	10/29/2021
Laboratory Sample ID	MW-143 (157'-162') 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	MW-143 (167'-172')	Analysis Date	10/29/2021
Laboratory Sample ID	MW-143 (167'-172') 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1029211	Preparation Date	10/29/2021
Client Sample ID	TW-14	Analysis Date	11/02/2021
Laboratory Sample ID	TW-14 102821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/28/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	4
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1029211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.11	0.004		М

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Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1029211

 SDG
 1029211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 4 40/00/04	40/00/0004	47.44.04	4.4.D:	100.01.1		- /	101.	0.004		

LRB-1 10/29/21 10/29/2021 17:14:24 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1029211

 SDG
 1029211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 102921 MS	10/30/2021	02:44:27	1,4-Dioxane	123-91-1		0.010	0.0099	mg/L	Wet	99.2	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1029211

 SDG
 1029211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 102921 MSD	10/30/2021	03:28:14	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	93.7	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1029211

SDG 1029211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample II	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/29/2	1 10/29/2021	16:30:30	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	103	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1029211

 SDG
 1029211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 102921 MS	10/30/2021	02:44:27	1,4-Dioxane	123-91-1	0.0099		mg/L	Wet			
ATS Tap Water 102921 MSD	10/30/2021	03:28:14	1,4-Dioxane	123-91-1	0.0094	0.0096	mg/L	Wet	5.6	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INFORMATION	SHIPPING	INFORM	MATION: SH	IPPER (Check one) /	TRACKING NUM	IBER(S) (If applica			
Pall	7044504963225	Date		Fed Ex	UPS	DHL	Courie	Tracking Nu	ımber	
SAMPLE CUSTODIAN (Print & Signature)		Date		Fed Ex	UPS	DHL	Courie			
Caca Trandel Caca	- Trendel@Pallicon	Dale		Fed Ex	ups	DHL	Courie	Tracking N	ımber	
DELINION NO. INC. INC. INC. INC. INC. INC. INC. INC	DATE (TIME DECEMED BY DOLLAR	Date	/ TIME	Fed Ex	UPS UPS HED BY (Print & Signatur	DHL	Courie DATE / TIME			
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	·	NERS	₹ .	No.						Sediment/Sludge Extract
O DATE	TIME 0 0 SAMPLE IDENTIFICATION	NO. OF CONTAINERS	PRIORITY NUMBER	1,4-Dioxeno						
1. Oct-Pall 10/28/2		ì_		3.00						
2 Rod Fond 10/25/21	7:15		<u></u>							
3. Comb-Eff notalz	7:20			200						
	7:30			1						
5. Eff-cc-ZA 10/29/21	7:30		ļ							
	7:35									
	7:40									
8 Outfall Test 10/28/2	d > :45									
9. MW-143 (137-142') 6/25/21	₹:55			100						
10. (157-162) 10/25/21	1145			T Section 1						
	1400	and the same of th								
	10:30									
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18.				1						
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### Sarah Stubblefield

From: Trendel, Gage <gage\_trendel@pall.com>

**Sent:** Friday, October 29, 2021 9:26 AM **To:** Sarah Stubblefield; Gage Trendel

**Subject:** RE: Sample Discrepancy

Yep. That's my bad.

### Confidential - Company Proprietary

From: Sarah Stubblefield <Sarah.Stubblefield@annarbortechnicalservices.com>

**Sent:** Friday, October 29, 2021 9:25 AM

To: Trendel, Gage <gage\_trendel@pall.com>; Gage Trendel <gtrendel@fv-operations.com>

**Subject:** Sample Discrepancy

Hi Gage.

Today's COC indicates a sample date of 10/29 for the three MW-143, but the labels say 10/28. Are you OK with us changing the COC to a date of 10/28 for these three samples?

-S-

Sarah Stubblefield | Senior Chemist / Laboratory Manager Tel: 734.995.0995 | Fax: 734.995.3731 | Cell: 734.368.4730 Email. Sarah.Stubblefield@AnnArborTechnicalServices.com

### Ann Arbor Technical Services, Inc.

290 South Wagner Road | Ann Arbor, Michigan 48103 Web. **AnnArborTechnicalServices.com** 

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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1101211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1101211 Client PO Number: 4504963225** 

### **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 11/01/21, and associated matrix-specific QA/QC:

### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 11/01/21				
Outfall 001	10/31/21	Urgent	1,4-Dioxane	Water
Comb Eff	11/1/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	11/1/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	11/1/21	Urgent	1,4-Dioxane	Water
BP-1	11/1/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	11/1/21	Urgent	1,4-Dioxane	Water
Outfall-Test	11/1/21	Urgent	1,4-Dioxane	Water
Outfall 001	10/30/21	Urgent	1,4-Dioxane	Water
Outfall 001	10/29/21	Urgent	1,4-Dioxane	Water
MW-121S	10/29/21	Standard	1,4-Dioxane	Water
MW-121d	10/29/21	Standard	1,4-Dioxane	Water
Red Pond	11/1/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 10 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 2 Sample

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None



### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

### <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 11/1/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Outfall 001	Analysis Date	11/01/2021
Laboratory Sample ID	Outfall 001 103121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/31/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Comments

Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

Sample analyzed at natitve pH.

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Comb Eff	Analysis Date	11/01/2021
Laboratory Sample ID	Comb Eff 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

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G001-002.21	Percent Moisture	100
1101211	Preparation Date	11/01/2021
Eff-OC-1A	Analysis Date	11/01/2021
Eff-OC-1A 110121	Instrument	2100V
Water	Subsample (mL)	5
11/01/2021	Final Volume (mL)	5
USEPA 1624	Dilution Factor	1
USEPA 1624	Basis	Wet
QCORG1101211	Units	mg/L
	1101211 Eff-OC-1A Eff-OC-1A 110121 Water 11/01/2021 USEPA 1624 USEPA 1624	1101211   Preparation Date

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Eff-OC-2A	Analysis Date	11/01/2021
Laboratory Sample ID	Eff-OC-2A 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	BP-1	Analysis Date	11/01/2021
Laboratory Sample ID	BP-1 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Outfall Grab	Analysis Date	11/01/2021
Laboratory Sample ID	Outfall Grab 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Outfall Test	Analysis Date	11/01/2021
Laboratory Sample ID	Outfall Test 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Outfall 001	Analysis Date	11/01/2021
Laboratory Sample ID	Outfall 001 103021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/30/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Outfall 001	Analysis Date	11/01/2021
Laboratory Sample ID	Outfall 001 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	Red Pond	Analysis Date	11/01/2021
Laboratory Sample ID	Red Pond 110121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	11/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.30	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	MW-121s	Analysis Date	11/01/2021
Laboratory Sample ID	MW-121s 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1101211	Preparation Date	11/01/2021
Client Sample ID	MW-121D	Analysis Date	11/02/2021
Laboratory Sample ID	MW-121D 102921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/29/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1101211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1101211

 SDG
 1101211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
1.00 4.44/4/04	44/04/0004	44.00.40	4.4.5:	100.01.1			\A/ /	0.004		

LRB-1 11/1/21 11/01/2021 11:22:46 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1101211

SDG 1101211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 11/1/21	11/01/2021	10:38:49	1,4-Dioxane	123-91-1		0.010	0.0098	mg/L	Wet	98.4	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1101211

SDG 1101211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 110121 MS	11/01/2021	22:17:23	1,4-Dioxane	123-91-1	0.30	0.40	0.73	mg/L	Wet	109	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1101211

 SDG
 1101211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 110121 MSD	11/01/2021	23:01:05	1,4-Dioxane	123-91-1	0.30	0.40	0.78	mg/L	Wet	120	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY**

Method: **USEPA 1624** QA/QC Batch Number: QCORG1101211

SDG 1101211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Ī	Red Pond 110121 MS	11/01/2021	22:17:23	1,4-Dioxane	123-91-1	0.73		mg/L	Wet			
ı	Red Pond 110121 MSD	11/01/2021	23:01:05	1,4-Dioxane	123-91-1	0.78	0.76	mg/L	Wet	6.2	20	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9904 Wisconsin Laboratory ID: 998321720

$\sim 11$			DRMATION			ic livi Of	INATION, SHIP	PER (Check one) / T	RACKING NU	MBER(S) (It	applicable)			
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Souples needed by 11/5		out	feil 1	effs Dufresened						ANALYSIS				
COMMENTS (Peservation, etc.) Souples needed by 11/5 45 deey hold time—	DOK	<u> </u>	<u>- 04</u>	MCZ DIACI DELENA	24 	PRIORITY NUMBER	1,4-Deran							MATRIX Indicate Soil/Water/Air
O N H BAR CODE		a S	B B		NO. OF CONTAINERS	ORITY ?	7							Sediment/Sludge Extract
	DATE	TIME S	GRAB	SAMPLE IDENTIFICATION		R R								
1. Outfall	10/31/21		11	urcont	_ i _		<del>                                     </del>							
2 Comb-Eff	11/11/21				į	<del> </del>								
3 E-FF-OC-1A	11/1/21	7.10												
4 Eff-OC-ZA 5 BP-1	11/1/21		1				Land Control							
5. BP-1	11/1/21	7:15												
6. Outfall-Grab	11/1/21	7:20												
7. Outfall - Test	11/11/21	7:25					T. C.							
8. Outfall	10/302		1				- James and American							
9. Oct-fell	10/29/2		7		- Landerson									
10. MW-1215	10/2/21	11'.14	1											
11. MW-121d	10/29/21		~	<u> </u>							_			
12. Red Poul	1/1/21		1										1	
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16.			++		+	-	++	-		+			+++	
20.	1													

### Sarah Stubblefield

From: Trendel, Gage <gage\_trendel@pall.com>
Sent: Tuesday, November 2, 2021 8:33 AM

**To:** Sarah Stubblefield **Subject:** RE: Yesterday's samples

No problem. That's what I'd of asked for regardless.

### Confidential - Company Proprietary

From: Sarah Stubblefield <Sarah.Stubblefield@annarbortechnicalservices.com>

**Sent:** Tuesday, November 2, 2021 8:24 AM **To:** Trendel, Gage <gage\_trendel@pall.com>

**Subject:** Yesterday's samples

Just a head's up. We received a Red Pond samples, but it wasn't on the COC...we ran it like normal with an urgent TAT.

Sorry, meant to confirm this with you yesterday, but my day got away from me.

-S-

Sarah Stubblefield | Senior Chemist / Laboratory Manager Tel: 734.995.0995 | Fax: 734.995.3731 | Cell: 734.368.4730 Email. Sarah.Stubblefield@AnnArborTechnicalServices.com

### Ann Arbor Technical Services, Inc.

290 South Wagner Road | Ann Arbor, Michigan 48103 Web. **AnnArborTechnicalServices.com** 

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### **Data Transmittal Cover Page**

**Project Name:** Pall Corporation

ATS Project Number: G001-002

ATS Report Number(s): Inorg\_SRF\_Oct\_PO9621

Client PO Number: 4504859621

Project Description: This data report contains the results of 182 water samples, received by ATS

during the month of October, to be analyzed for 1,4-Dioxane.

We certify that the sample analyses for this report have been conducted in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written Standard Operating Procedure specific to the ATS Laboratories, as required by USEPA. Laboratory data sheets, SOPs, and QA/QC information are available for inspection and audit at the laboratory upon request. Unless specifically noted on the data report, all applicable sample preservation and holding time requirements have been met.

Recipient:	Mr. Gage Trendel		Email: FAX Number:	gtrendel@fv-operations.com
No. of Page	s (including cover pg.):	350		
From:	Sarah Stubblefield Senior Chemist / Lab Manager	Email: FAX Number:	<u>Sarah.Stubblefie</u> 734-995-3731	eld@AnnArborTechnicalServices.com
Additional N	Message:			
Date:	11/5/21	Signed:	34.98	

IF YOU DO NOT RECEIVE ALL PAGES OF THIS TRANSMITTAL, PLEASE CALL 734-995-0995.

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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1001211

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1001211** Client PO Number: 4504859621

### **Case Narrative Summary**

This case narrative applies to the following seven samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/1/21, and associated matrix-specific QA/QC:

### **Samples**

~					
Cli	ent Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Rec	ceived 10/1/21				
	Outfall	9/30/21	Urgent	1,4-Dioxane	Water
	Eff-OC-2A	10/1/21	Urgent	1,4-Dioxane	Water
	Eff-OC-1A	10/1/21	Urgent	1,4-Dioxane	Water
	BP-1	10/1/21	Urgent	1,4-Dioxane	Water
	Outfall-Grab	10/1/21	Urgent	1,4-Dioxane	Water
	Outfall-Test	10/1/21	Urgent	1,4-Dioxane	Water
	Comb. Eff.	10/1/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

Analysis

Number of Samples

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

7 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None



### **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

### <u>Laboratory Fortified Blanks / Laboratory Control Samples</u>

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None

### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• None

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Joek alexon

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Outfall 001	Analysis Date	10/01/2021
Laboratory Sample ID	Outfall 001 093021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	09/30/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/01/2021
Laboratory Sample ID	Eff-OC-2A 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/01/2021
Laboratory Sample ID	Eff-OC-1A 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	BP-1	Analysis Date	10/01/2021
Laboratory Sample ID	BP-1 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Outfall Grab	Analysis Date	10/01/2021
Laboratory Sample ID	Outfall Grab 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Outfall Test	Analysis Date	10/01/2021
Laboratory Sample ID	Outfall Test 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1001211	Preparation Date	10/01/2021
Client Sample ID	Comb Eff	Analysis Date	10/01/2021
Laboratory Sample ID	Comb Eff 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1001211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1001211

 SDG
 1001211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

# Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 1 10/1/21	10/01/2021	10.21.55	1.4 Dioyono	122 01 1	•	ma/l	\\/ot	0.001		-

LRB-1 10/1/21 10/01/2021 10:21:55 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1001211

SDG 1001211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/1/21	10/01/2021	09:37:31	1,4-Dioxane	123-91-1		0.010	0.0093	mg/L	Wet	92.6	85	115	_

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1001211

SDG 1001211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-14 091721 MS	10/01/2021	17:18:56	1,4-Dioxane	123-91-1	1.2	2.0	3.3	mg/L	Wet	106	80	120	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1001211

 SDG
 1001211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-14 091721 MSD	10/01/2021	18:03:12	1,4-Dioxane	123-91-1	1.2	2.0	3.2	mg/L	Wet	102	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1001211

 SDG
 1001211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
TW-14 091721 MS	10/01/2021	17:18:56	1,4-Dioxane	123-91-1	3.3		mg/L	Wet			
TW-14 091721 MSD	10/01/2021	18:03:12	1,4-Dioxane	123-91-1	3.2	3.2	mg/L	Wet	1.9	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-9995 Fax. 734/995-3731 Michigan Laboratory ID: 9804 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INFORMATIO	20	Tourney to		LATION AUTOR					
PROJECT ID PROMBER	LABORATORY INFORMATION	04859624	1 1			ER (Check one) / TR	7			
SAMPLE CUSTODIAN (Print & Signature)	104110	1	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
		dal (2) Pill com	Date Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
Coge Trendel Go	19 - 1000	color lances			Fed Ex	UPS	DHL	Courier	Tracking Number	
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2 Eff-0C-ZA 1011/21	7:20		1							
3. Eff-OC-1A 10/1121	7:28									
4. BP-1 10/11/21	7:25		-							
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1004211** 

# **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1004211 Client PO Number: 4504859621** 

### **Case Narrative Summary**

This case narrative applies to the following eleven samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/4/21, and associated matrix-specific QA/QC:

Samples

Samples				
Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/1/21				
Outfall	10/3/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/4/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/4/21	Urgent	1,4-Dioxane	Water
BP-1	10/4/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/4/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/4/21	Urgent	1,4-Dioxane	Water
Comb. Eff.	10/4/21	Urgent	1,4-Dioxane	Water
Red Pond	10/4/21	Urgent	1,4-Dioxane	Water
BP-1 #2	10/4/21	Urgent	1,4-Dioxane	Water
Outfall-Grab #2	10/4/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A #2	10/4/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

<u>Analysis</u>

Number of Samples

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

11 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• Red Pond 10/4/21 was received un-preserved and analyzed at native pH.

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

# **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None



## Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

# Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

# **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/4/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Tock Olitons

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Outfall 001	Analysis Date	10/04/2021
Laboratory Sample ID	Outfall 001 1003211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/03/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/04/2021
Laboratory Sample ID	Eff-OC-1A 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/04/2021
Laboratory Sample ID	Eff-OC-2A 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioyane	123-91-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	BP-1	Analysis Date	10/04/2021
Laboratory Sample ID	BP-1 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Outfall Grab	Analysis Date	10/04/2021
Laboratory Sample ID	Outfall Grab 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioyana	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Outfall Test	Analysis Date	10/04/2021
Laboratory Sample ID	Outfall Test 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Comb Eff	Analysis Date	10/04/2021
Laboratory Sample ID	Comb Eff 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Red Pond	Analysis Date	10/04/2021
Laboratory Sample ID	Red Pond 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.39	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	BP-1 #2	Analysis Date	10/05/2021
Laboratory Sample ID	BP-1 #2 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Outfall Grab #2	Analysis Date	10/05/2021
Laboratory Sample ID	Outfall Grab #2 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1004211	Preparation Date	10/04/2021
Client Sample ID	Eff-OC-2A #2	Analysis Date	10/05/2021
Laboratory Sample ID	Eff-OC-2A #2 1004211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1004211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyana	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1004211

 SDG
 1004211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

# Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 1 10/4/21	10/04/2021	10.02.02	1.4 Dioyana	122 01 1		ma/l	\\/ot	0.004		

LRB-1 10/4/21 10/04/2021 18:03:02 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1004211

SDG 1004211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/4/21	10/04/2021	17:18:42	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	99.8	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1004211

 SDG
 1004211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1004211 MS	10/05/2021	02:55:50	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	108	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1004211

 SDG
 1004211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1004211 MSD	10/05/2021	03:40:15	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	112	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1004211

 SDG
 1004211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 1004211 MS	10/05/2021	02:55:50	1,4-Dioxane	123-91-1	0.011		mg/L	Wet			
ATS Tap Water 1004211 MSD	10/05/2021	03:40:15	1,4-Dioxane	123-91-1	0.011	0.011	mg/L	Wet	3.5	20	

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 980321720

PROJECT ID / NUMBER		ARORATORY INFO	ORMATIO	,	SHIPPING	3 INFORM	MATION: SI	HIPPER (Ch	eck one) / TRA	CKING NUM	ARER/S) /If ar	nnlleshi				
	2	FO#4	150L	159621	Date		Fed Ex		JPS	DHL		ourier		Tracking Nu		
SAMPLE CUSTODIAN (Print & Signature)		,			Date		Fed Ex	<del></del>	JPS	DHL		ourier		Tracking Nu		
Con Trevale!	Cos	he	Teu	elel@Pall.com	Date		Fed Ex		JPS	DHL	C	ourier		Tracking Nu		
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		<del></del>			NERS	l N ⊢	36									Sedimeni/Sludge Extract
BAR CODE	DATE	TIME ON G	GRAB	SAMPLE IDENTIFICATION	NO. OF CONTAINERS	PRIORITY NUMBER	- 14-Dissan									LANGU
1. Outfell	13/21 J	NIA		Urgent	1		Ç Ç									
2 EPF-OC-1A /L	0/4/21	6:35			3		2000			_						
3. Eff-0x-ZA 10	0/4/21	6:35														
	10/4/21	6:40			Tendation		- Approximation of the contract of the contrac					į				
5. Outfall - Grab	0/4/21	C1:45			arman and a											
6. Outfall - Test	014/21	6:50			***************************************											
1 1 -	0/4/21		] [		-		1									
8. Red Pond N	10/4/21	6:25					de la constitución de la constit					1				
9. BP-1 #Z	10/4/21	9:45			T		and the second									
	10/4/21												ļ .			
11. BR-0C-ZA #Z	10/4/21	9:55					l l									
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1005211** 

# **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

SRF / SDG Number(s): 1005211 Client PO Number: 4504859621

### **Case Narrative Summary**

This case narrative applies to the following seven samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/5/21, and associated matrix-specific QA/QC:

### **Samples**

Sampics				
Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/5/21				
Outfall 001	10/4/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/5/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/5/21	Urgent	1,4-Dioxane	Water
BP-1	10/5/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/5/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/5/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/5/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

<u>Analysis</u>

Number of Samples

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

7 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

- None
- \_

# Analytical QA/QC Summary

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

## **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

# **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None



## Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

# Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

# Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

# **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• None

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Outfall 001	Analysis Date	10/05/2021
Laboratory Sample ID	Outfall 001 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/05/2021
Laboratory Sample ID	Eff-OC-1A 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1 4-Dioyana	123-01-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/05/2021
Laboratory Sample ID	Eff-OC-2A 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1 4-Dioyana	123-01-1	0.005	0.001		

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	BP-1	Analysis Date	10/05/2021
Laboratory Sample ID	BP-1 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Outfall Grab	Analysis Date	10/05/2021
Laboratory Sample ID	Outfall Grab 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioyana	123-01-1	0.005	0.001		

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Outfall Test	Analysis Date	10/05/2021
Laboratory Sample ID	Outfall Test 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1005211	Preparation Date	10/05/2021
Client Sample ID	Comb Eff	Analysis Date	10/05/2021
Laboratory Sample ID	Comb Eff 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1005211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY BLANK SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1005211

SDG 1005211 G001-002.21 Project Number: Report Date: 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
Lab Cample IB	7 maryolo Bato	7 thatyold Time	Onomiodi Namo	67.10	rtooun	Onito	Baolo	Would Botootion Limit	resporting Botootion Emile	Commente
LDD 1 10/E/21	10/05/2021	00.20.10	1.4 Dioyono	122 01 1		ma/l	\\/ot	0.001		

123-91-1 LRB-1 10/5/21 10/05/2021 09:39:19 1,4-Dioxane 0.001



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1005211

SDG 1005211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/5/21	10/05/2021	08:54:59	1,4-Dioxane	123-91-1		0.010	0.011	mg/L	Wet	108	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1005211

 SDG
 1005211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1005211 MS	10/05/2021	19:03:43	1,4-Dioxane	123-91-1		0.0050	0.0054	mg/L	Wet	108	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1005211

 SDG
 1005211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1005211 MSD	10/05/2021	19:47:57	1,4-Dioxane	123-91-1		0.0050	0.0054	mg/L	Wet	107	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1005211

SDG 1005211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 1005211 MS	10/05/2021	19:03:43	1,4-Dioxane	123-91-1	0.0054		mg/L	Wet			
ATS Tap Water 1005211 MSD	10/05/2021	19:47:57	1,4-Dioxane	123-91-1	0.0054	0.0054	mg/L	Wet	0.83	20	



PROJECT ID / NUMBER	LABORATORY INFORMATION	SHIPPING	INFORM	ATION: SI	HIPPER (Check one) / Tr	RACKING NUN	ABER(S) (If applicab	le)	
SAMPLE CUSTODIAN (Print & Signature)	PO#45047579621	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
PROJECT ID / NUMBER POLICY SAMPLE CUSTODIAN (Print & Signature)  Gage Trende Go  RELINQUISHED BY (Print & Signature)	1 2 2 2 1	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
Good Trendel Go	age Trevolet Ctallicam	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
age was	¥	Date		Fed Ex	UPS	DHL	Courier	Tracking Number	
RELINQUISHED BY (Prict & Signature)		DATE/	TIME	RELINQU!	SHED BY (Print & Signature)		DATE / TIME	RECEIVED BY (Print & Signature)	DATE / TIME
COMMENTS (Paragration pla)	10/5/21								
RELINQUISHED BY (Print & Signature)	DATE / TIME RECEIVED BY PHOLOS SIGNATURE)  8:55  Bradley 10:46  No preservative	DATE /	TIME	RELINQUI	SHED BY (Print & Signature)		DATE / TIME	RECEIVED BY (Print & Signature)	DATE / TIME
	5:55 Bin 1911								
COMMENTS (Preservation, etc.)	10.03 Ho Dradley 10.80	<u> </u>					ANALYSIS		
COMMENTS (Preservation, etc.) Samples recorded in Zinhis. 45 day hold time box	No preservative		~			,	AWALTSIS		<u>.</u>
45 day hold time - DOIL	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		PRIORITY NUMBER	('t-Diekerne					MATRIX Indicate Soil/Water/Air
		ERS	N ∧	og Lege			1		Sediment/Sludge
OZ BAR CODE DATE	G B	NO. OF CONTAINERS	ORIT	2					Extract
	TIME SAMPLE IDENTIFICATION	28	<u>R</u>	==					
1. Outfall 1014/24	1 NA Urgent	1		Ì					
2 EPT-OC-1A 1015/2	7:15	i		action to a					
3 Eff-OC-ZA 10/5/2	· · · · · · · · · · · · · · · · · · ·								
14 BP-1 1015121	<del></del>								
5. Outfall-Grab 10/5/2									
6. Orifall-Test 10/5/21									
7. Comb Eff. 10/5/2				-					
8.									
9.									
10.									
11.									
12.									<del>-</del>
13.						-			
14.									
15.									
16.									
17.									
18.									
19.									
20.									



# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1006211

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

**ATS Project Number: G001-002** 

**Report Date: 11/4/21** 

SRF / SDG Number(s): 1006211 Client PO Number: 4504859621

### **Case Narrative Summary**

This case narrative applies to the following 23 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/6/21, and associated matrix-specific QA/QC:

**Samples** 

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/6/21				
Outfall 001	10/5/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/6/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/6/21	Urgent	1,4-Dioxane	Water
BP-1	10/6/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/6/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/6/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/6/21	Urgent	1,4-Dioxane	Water
4141 Jackson Road	9/15/21	Urgent	1,4-Dioxane	Water
TW-22	10/1/21	Standard	1,4-Dioxane	Water
TW-29	10/1/21	Urgent	1,4-Dioxane	Water
TW-17	10/5/21	Standard	1,4-Dioxane	Water
TW-24	10/5/21	Standard	1,4-Dioxane	Water
TW-11	10/5/21	Standard	1,4-Dioxane	Water
TW-14	10/5/21	Standard	1,4-Dioxane	Water
TW-5	10/5/21	Standard	1,4-Dioxane	Water
MW-53d	10/4/21	Standard	1,4-Dioxane	Water
MW-53s	10/4/21	Standard	1,4-Dioxane	Water
MW-53I	10/4/21	Standard	1,4-Dioxane	Water
A2 Cleaning Supply	10/4/21	Standard	1,4-Dioxane	Water
MW-84s	10/4/21	Standard	1,4-Dioxane	Water
MW-103s	10/5/21	Standard	1,4-Dioxane	Water
MW-112I	10/5/21	Standard	1,4-Dioxane	Water
MW-112s	10/5/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 9 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 14 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None



### <u>Instrument Blanks</u>

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

### **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

- TW-22 10/1/21
- TW-14 10/5/21
- TW-17 10/5/21
- TW-5 10/5/21
- TW-24 10/5/21
- MW-84s 10/4/21
- TW-11 10/5/21

Mark alexong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Outfall 001	Analysis Date	10/06/2021
Laboratory Sample ID	Outfall 001 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/06/2021
Laboratory Sample ID	Eff-OC-1A 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/06/2021
Laboratory Sample ID	Eff-OC-2A 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Identifier Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	BP-1	Analysis Date	10/06/2021
Laboratory Sample ID	BP-1 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Outfall Grab	Analysis Date	10/06/2021
Laboratory Sample ID	Outfall Grab 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Outfall Test	Analysis Date	10/06/2021
Laboratory Sample ID	Outfall Test 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	Comb Eff	Analysis Date	10/06/2021
Laboratory Sample ID	Comb Eff 100621	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



G001-002.21	Percent Moisture	100
1006211	Preparation Date	10/06/2021
4141 Jackson Road	Analysis Date	10/06/2021
4141 Jackson Road 91521	Instrument	2100V
Water	Subsample (mL)	5
09/15/2021	Final Volume (mL)	5
USEPA 1624	Dilution Factor	1
USEPA 1624	Basis	Wet
QCORG1006211	Units	mg/L
	1006211 4141 Jackson Road 4141 Jackson Road 91521 Water 09/15/2021 USEPA 1624 USEPA 1624	1006211         Preparation Date           4141 Jackson Road         Analysis Date           4141 Jackson Road 91521         Instrument           Water         Subsample (mL)           09/15/2021         Final Volume (mL)           USEPA 1624         Dilution Factor           USEPA 1624         Basis

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.002	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	TW-29	Analysis Date	10/06/2021
Laboratory Sample ID	TW-29 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.45	0.02		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	MW-103S	Analysis Date	10/10/2021
Laboratory Sample ID	MW-103S 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.082	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	MW-112I	Analysis Date	10/10/2021
Laboratory Sample ID	MW-112I 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.000	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006211	Preparation Date	10/06/2021
Client Sample ID	MW-112S	Analysis Date	10/10/2021
Laboratory Sample ID	MW-112S 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.003	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-22	Analysis Date	10/28/2021
Laboratory Sample ID	TW-22 100121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/01/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.45	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-17	Analysis Date	10/28/2021
Laboratory Sample ID	TW-17 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.10	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-24	Analysis Date	10/28/2021
Laboratory Sample ID	TW-24 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	1.9	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-11	Analysis Date	10/28/2021
Laboratory Sample ID	TW-11 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.16	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-14	Analysis Date	10/29/2021
Laboratory Sample ID	TW-14 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.10	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	TW-5	Analysis Date	10/28/2021
Laboratory Sample ID	TW-5 100521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/05/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.61	0.02		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	MW-53D	Analysis Date	10/23/2021
Laboratory Sample ID	MW-53D 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	MW-53S	Analysis Date	10/23/2021
Laboratory Sample ID	MW-53S 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	MW-53I	Analysis Date	10/23/2021
Laboratory Sample ID	MW-53I 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.038	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	A2 Cleaning Supply	Analysis Date	10/09/2021
Laboratory Sample ID	A2 Cleaning Supply 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.051	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1006212	Preparation Date	10/06/2021
Client Sample ID	MW-84S	Analysis Date	10/28/2021
Laboratory Sample ID	MW-84S 100421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/04/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1006212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.50	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1006211

 SDG
 1006211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L PR-1 10/6/21	10/06/2021	12:26:22	1.4 Dioyana	122 01 1		ma/l	\Mot	0.001	21 2 3 2 2 2 2 2 2 2	

LRB-1 10/6/21 10/06/2021 12:26:33 1,4-Dioxane 123-91-1 mg/L Wet 0.00

#### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1006212

 SDG
 1006212

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 0.40/0/04	40/00/0004	05.57.00	4.4 Diamana	400.04.4		//	10/-4	0.004		

LRB-2 10/6/21 10/23/2021 05:57:36 1,4-Dioxane 123-91-1 mg/L Wet 0.001

#### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1006211

SDG 1006211 Project Number: G001-002.21 Report Date: 11/4/2021

#### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/6/21	10/06/2021	11:42:10	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	102	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1006211

SDG 1006211 Project Number: G001-002.21 Report Date: 11/4/2021

#### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-29 100121 MS	10/06/2021	15:28:12	1,4-Dioxane	123-91-1	0.45	0.40	0.82	mg/L	Wet	92.9	80	120	

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1006211

 SDG
 1006211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-29 100121 MSD	10/06/2021	16:24:03	1,4-Dioxane	123-91-1	0.45	0.40	0.78	mg/L	Wet	83.8	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1006212

SDG 1006212 Project Number: G001-002.21 Report Date: 11/4/2021

#### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-2 10/6/21	10/23/2021	05:13:48	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	104	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1006212

SDG 1006212 Project Number: G001-002.21 Report Date: 11/4/2021

#### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-14 100521 MS	10/29/2021	03:27:57	1,4-Dioxane	123-91-1	0.10	0.10	0.21	mg/L	Wet	105	80	120	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1006212

 SDG
 1006212

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
TW-14 100521 MSD	10/29/2021	04:11:52	1,4-Dioxane	123-91-1	0.10	0.10	0.19	mg/L	Wet	91.5	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1006211

 SDG
 1006211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
TW-29 100121 MS	10/06/2021	15:28:12	1,4-Dioxane	123-91-1	0.82		mg/L	Wet			
TW-29 100121 MSD	10/06/2021	16:24:03	1,4-Dioxane	123-91-1	0.78	0.80	mg/L	Wet	4.5	20	

#### Comment

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1006212

 SDG
 1006212

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
TW-14 100521 MS	10/29/2021	03:27:57	1,4-Dioxane	123-91-1	0.21		mg/L	Wet			
TW-14 100521 MSD	10/29/2021	04:11:52	1,4-Dioxane	123-91-1	0.19	0.20	mg/L	Wet	6.9	20	

#### Comment

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.



PROJECT ID / NUMBER		LABORATORY IN			SHIPPING	INFORM	MATION: 8	SHIPPER	Check one) / TRA	ACKING NUM	BER(S) (I	f applicable	 e)			
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2. Fff-CC-1A	polelza	7:30		Urgent												
3. Eff-CC-ZX	OKIZI	7:30		Urent												
4. BP-1	10/6/21	71:35		Urgent Urgent Urgent Urgent Urgent Urgent Urgent Urgent Urgent Urgent Urgent												
5. Outfall Grab	plula	7:40		Urgent	:											
6 Outfall Test	15/6/21	7:45		Vicent												
7. Comb - Eff.	151210		T	Vicent												
	9/15/21	12:27		Urgent												
9. TW-ZZ	whiz	11.15		<u> </u>												
10. TW-25	polite	10:30		Ugent												
11. TW-18	10/5/2	09:20														
12. TW-ZY	10/5/21	9:25														
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17. MW-535	10/4/21										_					
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290 South Wagner Road Ann Arbor, Michigan 48103 Tet. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9904 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INFORMATION	SHIPPING	G INFORM	7 F	HIPPER (C	Г	_	MBER(S) (If applica	ble)	1	
SAMPLE CUSTODIAN (Print & Stgnature)		Date		Fed Ex		UPS	DHL	Courier	1 -	Tracking Number	
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		Date		Fed Ex		UPS	DHL	Courier	<del>                                     </del>	Tracking Number	
RELINQUISHED BY (Print & Signature)	DATE / TIME RECEIVED (Print & Signature)	Date DATE	/ TIME	Fed Ex RELINQUI	ISHED BY	(Print & Signature)	DHL	DATE / TIME		Tracking Number ED BY (Print & Signature)	DATE / TIME
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### Sarah Stubblefield

From: Sent: To: Subject:	Trendel, Gage <gage_trendel@pall.com> Thursday, October 28, 2021 9:45 AM Sarah Stubblefield; Gage Trendel RE: Sample ID Help</gage_trendel@pall.com>
Checked our in	house COC, and it should actually be TW-17. Not TW-18.
	Confidential - Company Proprietary
Sent: Thursday,	bblefield <sarah.stubblefield@annarbortechnicalservices.com> October 28, 2021 8:44 AM ge <gage_trendel@pall.com>; Gage Trendel <gtrendel@fv-operations.com> e ID Help</gtrendel@fv-operations.com></gage_trendel@pall.com></sarah.stubblefield@annarbortechnicalservices.com>
Hi Gage.	
	e out? We received a vial (see attached photo) that based on date, time, and process of elimination seem to line up with TW-18 on the COC (also label is a bit difficult to read, can you confirm that this sample is indeed TW-18 and not TW-17?

Thanks.

-S-

Sarah Stubblefield | Senior Chemist / Laboratory Manager Tel: 734.995.0995 | Fax: 734.995.3731 | Cell: 734.368.4730 Email. Sarah.Stubblefield@AnnArborTechnicalServices.com

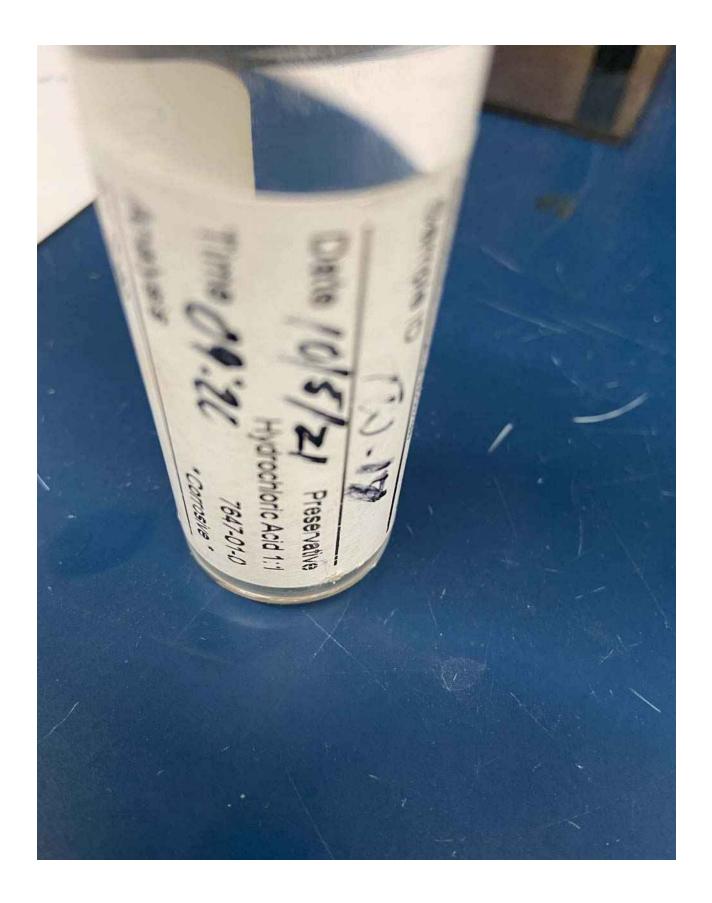
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1009211

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1007211 Client PO Number: 4504859621** 

#### **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/7/21, and associated matrix-specific QA/QC:

#### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/7/21				
Outfall 001	10/6/21	Urgent	1,4-Dioxane	Water
Comb Effluent	10/7/21	Urgent	1,4-Dioxane	Water
OC-1A Effluent	10/7/21	Urgent	1,4-Dioxane	Water
OC-2A Effluent	10/7/21	Urgent	1,4-Dioxane	Water
BP-1	10/7/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/7/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/7/21	Urgent	1,4-Dioxane	Water
A3	10/6/21	Urgent	1,4-Dioxane	Water
MW-110	10/6/21	Standard	1,4-Dioxane	Water
MW-104	10/6/21	Standard	1,4-Dioxane	Water
MW-76S	10/6/21	Standard	1,4-Dioxane	Water
MW-76i	10/6/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

#### **Analysis**

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

#### Number of Samples

- 8 Samples
- 4 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

#### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

#### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

#### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

#### Sample Analysis

<u>1,4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

#### **Analytical QA/QC Summary**

#### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

- None
- •

#### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None



#### **QA/QC Batch Summary**

#### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

#### <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

#### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

Lab Sample ID	Constituent	Percent Difference	Acceptance Limits
ATS Tap Water 1007211 MS/MSD	1,4-Dixoane	23	<20%



#### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• MW-110 10/6/21

• MW-76i 10/6/21

• MW-76s 10/6/21

Mockalarong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Outfall 001	Analysis Date	10/07/2021
Laboratory Sample ID	Outfall 001 1006211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

#### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Comb Eff	Analysis Date	10/07/2021
Laboratory Sample ID	Comb Eff 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/07/2021
Laboratory Sample ID	Eff-OC-1A 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/07/2021
Laboratory Sample ID	Eff-OC-2A 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	BP-1	Analysis Date	10/07/2021
Laboratory Sample ID	BP-1 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Outfall Grab	Analysis Date	10/07/2021
Laboratory Sample ID	Outfall Grab 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	Outfall Test	Analysis Date	10/07/2021
Laboratory Sample ID	Outfall Test 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	A3	Analysis Date	10/07/2021
Laboratory Sample ID	A3 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	MW-110	Analysis Date	10/10/2021
Laboratory Sample ID	MW-110 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.12	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	MW-104	Analysis Date	10/10/2021
Laboratory Sample ID	MW-104 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.026	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	MW-76S	Analysis Date	10/23/2021
Laboratory Sample ID	MW-76S 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.27	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1007211	Preparation Date	10/07/2021
Client Sample ID	MW-76I	Analysis Date	10/10/2021
Laboratory Sample ID	MW-76I 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/06/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG10072221	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.10	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L PR-1 10/7/21	10/07/2021	10:35:40	1.4 Dioyana	122 01 1		ma/l	\\/ot	0.001		

LRB-1 10/7/21 10/07/2021 10:35:40 1,4-Dioxane 123-91-1 mg/L wet 0.0

#### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG10072221

SDG 1007211 Project Number: G001-002.21 Report Date: 11/4/2021

#### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/7/21	10/07/2021	09:51:21	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	104	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1007211 MS	10/07/2021	19:28:35	1,4-Dioxane	123-91-1		0.010	0.012	mg/L	Wet	118	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

#### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 1007211 MSD	10/07/2021	20:12:57	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	93.9	80	120	

#### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG10072221

SDG 1007211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
MW-76I 1007211 MS	10/10/2021	04:53:30	1,4-Dioxane	123-91-1	0.10	0.20	0.29	mg/L	Wet	94.1	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG10072221

SDG 1007211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
MW-76I 1007211 MSD	10/10/2021	05:37:47	1,4-Dioxane	123-91-1	0.10	0.20	0.29	mg/L	Wet	95.3	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG10072221

SDG 1007211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 1007211 MS	10/07/2021	19:28:35	1,4-Dioxane	123-91-1	0.012		mg/L	Wet			
ATS Tap Water	10/07/2021	20:12:57	1,4-Dioxane	123-91-1	0.0094	0.011	mg/L	Wet	23	20	

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
MW-76I 1007211 MS	10/10/2021	04:53:30	1,4-Dioxane	123-91-1	0.29		mg/L	Wet			
MW-76I 1007211 MSD	10/10/2021	05:37:47	1,4-Dioxane	123-91-1	0.29	0.29	mg/L	Wet	0.82	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

mw-110

mw-104

mw-761

1 mw-76 S

10-6-21

10-6 7i

106-21

13:50

12532

11:11

11-6-21 09:50

Standard T.A.

Std. Turn Around

STATA

STE TIP



PROJECT ID / NUMBER

Daily Samples

COMMENTS (Preservation, etc.)

Please

BAR CODE

10.

13. 14. 15. 16. 17. 18. 19. 20.

SAMPLE CUSTODIAN (Print & Signature)

290 South Wagner Road Ann Arbor, Michigan 48103 Tet. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

PO#4504859621 SHIPPING INFORMATION: SHIPPER (Check one) / TRACKING NUMBER(S) (If applicable) Gelman Scrence Inc.
642 5. Wagness
Ann Arbor, Wi. 48103 Tracking Number SUSAN E.O. PC+ELD

SUSAN E.O. PC+ELD

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Send date to Sue\_Peteis@Poull.com and Gage\_Trender 1,4-drayarra @ Pallicom MATRIX Indicate Soil/Water/Air Sediment/Sludge Extract DATE 11 Outfall 00 1 NA Ungent 10-6-21 Comb-Effluent 720 107-21 OCH Effluent 7:25 16-7:21 OC 2A EFAUCH 7:25 18-7-21 BP. I 10-7-21 7:30 Outfall Grab 10721 7:35 U Outfall Tost 10-7-21 7:40 Ugent 9451 A3 unacont cone 10-6-31 15:15

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844

Std

sta



# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1008211

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1008211** 

**Client PO Number:** 

## **Case Narrative Summary**

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/8/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/8/21				
Outfall 001	10/7/21	Urgent	1,4-Dioxane	Water
OC-1A Eff	10/8/21	Urgent	1,4-Dioxane	Water
OC-2A Eff	10/8/21	Urgent	1,4-Dioxane	Water
BP-1	10/8/21	Urgent	1,4-Dioxane	Water
Grab	10/8/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/8/21	Urgent	1,4-Dioxane	Water
Comb Effluent	10/8/21	Urgent	1,4-Dioxane	Water
MW-11d	10/7/21	Standard	1,4-Dioxane	Water
MW-4d	10/7/21	Standard	1,4-Dioxane	Water
MW-35	10/7/21	Standard	1,4-Dioxane	Water
MW-66	10/7/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

1,4-Dioxane (USEPA 1624) – Standard TAT

## Number of Samples

- 7 Samples
- 4 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

G001-002.21/CN\_1008211.doc

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

## **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None



## Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None

## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• MW-11d 10/7/21

• MW-4d 10/7/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Touk alexon

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Outfall 001	Analysis Date	10/08/2021
Laboratory Sample ID	Outfall 001 1007211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/08/2021
Laboratory Sample ID	Eff-OC-1A 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/08/2021
Laboratory Sample ID	Eff-OC-2A 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	BP-1	Analysis Date	10/08/2021
Laboratory Sample ID	BP-1 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Outfall Grab	Analysis Date	10/08/2021
Laboratory Sample ID	Outfall Grab 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Outfall Test	Analysis Date	10/08/2021
Laboratory Sample ID	Outfall Test 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	Comb Effluent	Analysis Date	10/09/2021
Laboratory Sample ID	Comb Effluent 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	MW-11D	Analysis Date	10/09/2021
Laboratory Sample ID	MW-11D 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.26	0.01		М

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	MW-4D	Analysis Date	10/09/2021
Laboratory Sample ID	MW-4D 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.34	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	MW-35	Analysis Date	10/09/2021
Laboratory Sample ID	MW-35 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.002	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1008211	Preparation Date	10/08/2021
Client Sample ID	MW-66	Analysis Date	10/09/2021
Laboratory Sample ID	MW-66 1008211	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/07/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1008211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.002	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1008211

 SDG
 1008211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
L DD 4 40/0/04	40/00/0004	44.00.50	4.4 Diamana	402.04.4		//	10/-4	0.004		•

LRB-1 10/8/21 10/08/2021 11:22:53 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1008211

SDG 1008211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/8/21	10/08/2021	10:38:32	1,4-Dioxane	123-91-1		0.010	0.0092	mg/L	Wet	92.2	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
MW-76I 1007211 MS	10/10/2021	04:53:30	1,4-Dioxane	123-91-1	0.10	0.20	0.29	mg/L	Wet	94.1	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
MW-76I 1007211 MSD	10/10/2021	05:37:47	1,4-Dioxane	123-91-1	0.10	0.20	0.29	mg/L	Wet	95.3	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG10072221

 SDG
 1007211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
MW-76I 1007211 MS	10/10/2021	04:53:30	1,4-Dioxane	123-91-1	0.29		mg/L	Wet			
MW-76I 1007211 MSD	10/10/2021	05:37:47	1,4-Dioxane	123-91-1	0.29	0.29	mg/L	Wet	0.82	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER		LABORATORY IN			SHIPPIN	G INFORM	MATION: S	SHIPPER (Ch	eck one) / TR/	ACKING NUM	MBER(S) (If appl	cable)		
Daily Samples				iences Inc	Date		Fed Ex		JPS	DHL	Cour	ier	Tracking Number	
SAMPLE CUSTODIAN (Print & Signature)		642	5. U	100 new Ed	Date		Fed Ex		UPS	DHL	Cou		Tracking Number	
SUSANEONEDER		120N	Air	Pat W148103	Date		Fed Ex		JPS	DHL	Cou	ier	Tracking Number	
Sue-	-Petcis	@fall	· CC		Date		Fed Ex		JPS	DHL	Соц		Tracking Number	
RELINQUISHED BY (Print & Signature) SUSCENED, POLICE		10-8-2	ME	RECEIVED BY (Prittyle Signature)  RECEIVED BY (Prittyle Signature)	AY DATE	18/21	RELINQU	IISHED BY (A	rint & Signature)		DATE / TIME	RECI	EIVED BY (Print & Signature)	DATE / TIME
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RELINQUISHED BY (Print & Signature)		DATE / Til	4Ε /	RECEIVED BY Stint & Signature)	DATE	/ TIME	RELINQU	IISHED BY (F	rint & Signature)		DATE / TIME	REC	EIVED BY (Print & Signature)	DATE / TIME
COMMENTS (Preservation, etc.) PICOSE SCIND CENTRE +0	Bio. Pero	ens@1	g.VI.	com						,	ANALYSIS			
prices son recording		7000	do	1@ Pall can		Ë	ar Se							MATRIX
Carrot C	Jaq-	<u> </u>		10 100 100 100 100 100 100 100 100 100	- SE	PRIORITY NUMBER	1,4-dioxare					Ì		Indicate Soil/Water/A Sediment/Sludge
ÖN			o		NO. OF CONTAINERS	RITY	4-4							Extract
O U U U U U U U U U U U U U U U U U U U	DATE	TIME	GRAB	SAMPLE IDENTIFICATION	O S S	PRIO								
1.	10-7-21	Φ		Outfall 001	الكيلية ا	u	<b>✓</b>							Kigent
2.	16-8-31	7:15	/	OCIA EFF	1	in	V					_		1
3.	108-21	7:6	/	OCZAEFF	1	u								
4.	16-8-31	7:20	1		١	u	<b>V</b>							
5.	16-8-21	7:25	7	G-1010	1	U								
6.	10.8.2(	7:30	-	Outfall Test	10	u								
7	10-8-21	8:10	V	Comb Effluent	V	u	$\vee$							
8.	107-21	14:20	1	mw-11d	1	244	1							Std Tur
9.	10-7-21	13:01	N	m10-42	ì	ste	V							1
10.	10-721	11,30	/	mw-35	ĵ	sta	/							
11.	10-7-21	10:01	4	MB-66	١	Std								
12.														
13.														
14.														
15.														
16														
17.														
·9.														
1														



# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1011211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1011211 Client PO Number: 4504859621** 

## **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/11/21, and associated matrix-specific QA/QC:

### Samples

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/11/21				
Outfall	10/10/21	Urgent	1,4-Dioxane	Water
Comb-Eff	10/11/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/11/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/11/21	Urgent	1,4-Dioxane	Water
BP-1	10/11/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/11/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/11/21	Urgent	1,4-Dioxane	Water
Red Pond	10/11/21	Urgent	1,4-Dioxane	Water
MW-38d	10/8/21	Standard	1,4-Dioxane	Water
MW-38s	10/8/21	Standard	1,4-Dioxane	Water
MW-34s	10/8/21	Standard	1,4-Dioxane	Water
MW-34d	10/8/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

## Number of Samples

- 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 4 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

G001-002.21/CN\_1011211.doc

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

## **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

## **QA/QC Batch Summary**

### Internal Standards

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None



## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• One MS/ MSD was not reportable due to inadequate spiking levels relative to native sample concentrations.

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None

## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/11/21

Touk Milon

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Outfall 001	Analysis Date	10/11/2021
Laboratory Sample ID	Outfall 001 101021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/10/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Comments

Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Comb Effluent	Analysis Date	10/11/2021
Laboratory Sample ID	Comb Effluent 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/11/2021
Laboratory Sample ID	Eff-OC-1A 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/11/2021
Laboratory Sample ID	Eff-OC-2A 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	BP-1	Analysis Date	10/11/2021
Laboratory Sample ID	BP-1 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Outfall Grab	Analysis Date	10/11/2021
Laboratory Sample ID	Outfall Grab 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Outfall Test	Analysis Date	10/11/2021
Laboratory Sample ID	Outfall Test 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	Red Pond	Analysis Date	10/11/2021
Laboratory Sample ID	Red Pond 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.40	0.02		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	MW-38D	Analysis Date	10/18/2021
Laboratory Sample ID	MW-38D 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.041	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	MW-38S	Analysis Date	10/18/2021
Laboratory Sample ID	MW-38S 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	MW-34S	Analysis Date	10/19/2021
Laboratory Sample ID	MW-34S 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1011211	Preparation Date	10/11/2021
Client Sample ID	MW-34D	Analysis Date	10/19/2021
Laboratory Sample ID	MW-34D 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/08/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1011211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY BLANK SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1011211

SDG 1011211 G001-002.21 Project Number: Report Date: 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
LDD 1 10/11/21	10/11/2021	16.27.07	1.4 Dioyana	122 01 1		ma/l	\\/ot	0.001		

123-91-1 LRB-1 10/11/21 10/11/2021 16:37:07 1,4-Dioxane 0.001

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## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1011211

SDG 1011211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/11/21	10/11/2021	15:52:46	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	94.2	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1011211

 SDG
 1011211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101121 MS	10/11/2021	23:16:45	1,4-Dioxane	123-91-1	0.40	0.20	NR	mg/L	Wet	nc	80	120	

## <u>Comments</u> All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

NR - Not Reportable due to inadequate spiking levels relative to native sample concentrations.

nc - not calculated.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1011211

 SDG
 1011211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101121 MSD	10/12/2021	00:01:09	1,4-Dioxane	123-91-1	0.40	0.20	NR	mg/L	Wet	nc	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

NR - Not Reportable due to inadequate spiking levels relative to native sample concentrations.

nc - not calculated.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1011211

SDG 1011211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 101121 MS	10/11/2021	23:16:45	1,4-Dioxane	123-91-1	0.57		mg/L	Wet			
Red Pond 101121 MSD	10/12/2021	00:01:09	1,4-Dioxane	123-91-1	0.52	0.54	mg/L	Wet	10	20	



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6. Outfall-Grab	10/11/21							and to the same							
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1012211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

SRF / SDG Number(s): 1012211 Client PO Number: 4504859621

### **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/12/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/12/21				
Outfall 001	10/11/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/12/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/12/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/12/21	Urgent	1,4-Dioxane	Water
BP-1	10/12/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/12/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/12/21	Urgent	1,4-Dioxane	Water
Red Pond	10/12/21	Urgent	1,4-Dioxane	Water
MW-22	10/11/21	Standard	1,4-Dioxane	Water
MW-18d	10/11/21	Standard	1,4-Dioxane	Water
MW-64	10/11/21	Standard	1,4-Dioxane	Water
MW-32	10/11/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 4 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

G001-002.21/CN\_1012211.doc

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

## **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None



## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

Lab Sample ID	Constituent	Percent Recovery	Acceptance Limits
Red Pond 10/12/21 MS	1,4-Dioxane	76.7	80-120%

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None



## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

- MW-22 10/11/21
- Red Pond 10/12/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Outfall 001	Analysis Date	10/12/2021
Laboratory Sample ID	Outfall 001 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

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### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Comb Eff	Analysis Date	10/12/2021
Laboratory Sample ID	Comb Eff 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/12/2021
Laboratory Sample ID	Eff-OC-1A 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123_01_1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/12/2021
Laboratory Sample ID	Eff-OC-2A 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	BP-1	Analysis Date	10/12/2021
Laboratory Sample ID	BP-1 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Outfall Grab	Analysis Date	10/12/2021
Laboratory Sample ID	Outfall Grab 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Outfall Test	Analysis Date	10/12/2021
Laboratory Sample ID	Outfall Test 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	Red Pond	Analysis Date	10/12/2021
Laboratory Sample ID	Red Pond 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.39	0.04		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	MW-22	Analysis Date	10/21/2021
Laboratory Sample ID	MW-22 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	100
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	2.1	0.1		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	MW-18D	Analysis Date	10/20/2021
Laboratory Sample ID	MW-18D 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.056	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	MW-64	Analysis Date	10/21/2021
Laboratory Sample ID	MW-64 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.042	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1012211	Preparation Date	10/12/2021
Client Sample ID	MW-32	Analysis Date	10/21/2021
Laboratory Sample ID	MW-32 101121	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/11/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1012211	Units	mg/L

_	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.015	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1012211

 SDG
 1012211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample	ID Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
100 4 40/40	10.4.0.10.00.4	45.04.44	4.4.D:	100.04.4			147.	0.004		

LRB-1 10/12/21 10/12/2021 15:04:14 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1012211

SDG 1012211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/12/21	10/12/2021	14:19:51	1,4-Dioxane	123-91-1		0.010	0.010	mg/L	Wet	101	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1012211

SDG 1012211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101221 MS	10/12/2021	21:43:20	1,4-Dioxane	123-91-1	0.39	0.40	0.75	mg/L	Wet	89.3	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1012211

 SDG
 1012211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101221 MSD	10/12/2021	22:27:48	1,4-Dioxane	123-91-1	0.39	0.40	0.70	mg/L	Wet	76.7	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1012211

 SDG
 1012211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
R	ed Pond 101221 MS	10/12/2021	21:43:20	1,4-Dioxane	123-91-1	0.75		mg/L	Wet			
R	ed Pond 101221 MSD	10/12/2021	22:27:48	1,4-Dioxane	123-91-1	0.70	0.72	mg/L	Wet	7.0	20	

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



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SAMPLE CUSTODIAN (Print & Signature)					Date		Fed Ex	UPS	DHL		Courier		king Number	
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O Z H BAR CODE	DATE	TIME	COMP.	SAMPLE !DENTIFICATION	NO. OF CONTAINERS	PRIORITY NUMBER								Extract
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2. Comb-Eff	10/12/21	7:20												
3 Eff-0C-1A	10/12/21													
4. Eff-OC-ZA	10/12/21													
5. BP-1	poliziza	7:30												
6. Outfall - Gralo	iolizta	- 1												
7. Outfall-Test	_ 1011212													
8. Red Pond	10/12/21													
9. MW-2Z	1011121		/						_				-	
10. MW-18d	10/11/24	<b>I</b>	1									· -		
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1013211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

**ATS Project Number: G001-002** 

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1013211 Client PO Number: 4504859621** 

### **Case Narrative Summary**

This case narrative applies to the following 27 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/13/21, and associated matrix-specific QA/QC:

**Samples** 

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/13/21				
Outfall 001	10/12/21	Urgent	1,4-Dioxane	Water
Red Pond	10/13/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/13/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/13/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/13/21	Urgent	1,4-Dioxane	Water
BP-1	10/13/21	Urgent	1,4-Dioxane	Water
Outfall Grab	10/13/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/13/21	Urgent	1,4-Dioxane	Water
MW-45s	10/12/21	Standard	1,4-Dioxane	Water
MW-45d	10/12/21	Standard	1,4-Dioxane	Water
MW-52s	10/12/21	Standard	1,4-Dioxane	Water
MW-10d	10/12/21	Standard	1,4-Dioxane	Water
TW-2 (Dolph)	10/12/21	Standard	1,4-Dioxane	Water
Comb Eff	10/13/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/13/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/13/21	Urgent	1,4-Dioxane	Water
BP-1	10/13/21	Urgent	1,4-Dioxane	Water
Grab	10/13/21	Urgent	1,4-Dioxane	Water
PW-1	10/13/21	Standard	1,4-Dioxane	Water
TW-18	10/13/21	Standard	1,4-Dioxane	Water
TW-21	10/13/21	Standard	1,4-Dioxane	Water
TW-29	10/13/21	Standard	1,4-Dioxane	Water
TW-28	10/13/21	Standard	1,4-Dioxane	Water
TW-23	10/13/21	Standard	1,4-Dioxane	Water

G001-002.21/CN\_1013211.doc

Cl	ient Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
	TW-22	10/13/21	Standard	1,4-Dioxane	Water
	LB-4	10/13/21	Standard	1,4-Dioxane	Water
	TW-2 (Dolph)	10/13/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

	1	
Αı	nal	vsis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 13 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 14 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

<u>1,4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None



### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None

### Laboratory Reagent Blanks

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

- Red Pond 10/13/21
- MW-45d 10/12/21
- MW-52s 10/12/21
- MW-10d 10/12/21
- TW-2 (Dolph) 10/12/21
- PW-1 10/13/21
- TW-18 10/13/21
- TW-21 10/13/21
- TW-29 10/13/21
- TW-28 10/13/21
- TW-23 10/13/21
- TW-22 10/13/21
- LB-4 10/13/21
- TW-2 (Dolph) 10/13/21

Mark alexong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



2021
2021

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731

Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Red Pond	Analysis Date	10/13/2021
Laboratory Sample ID	Red Pond 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.39	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Comb Eff	Analysis Date	10/13/2021
Laboratory Sample ID	Comb Eff 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/13/2021
Laboratory Sample ID	Eff-OC-1A 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/13/2021
Laboratory Sample ID	Eff-OC-2A 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	BP-1	Analysis Date	10/13/2021
Laboratory Sample ID	BP-1 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Outfall Grab	Analysis Date	10/13/2021
Laboratory Sample ID	Outfall Grab 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Outfall Test	Analysis Date	10/13/2021
Laboratory Sample ID	Outfall Test 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	MW-45S	Analysis Date	10/14/2021
Laboratory Sample ID	MW-45S 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	MW-45D	Analysis Date	10/14/2021
Laboratory Sample ID	MW-45D 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.76	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	MW-52S	Analysis Date	10/14/2021
Laboratory Sample ID	MW-52S 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.19	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	MW-10D	Analysis Date	10/15/2021
Laboratory Sample ID	MW-10D 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.12	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	TW-2 (Dolph)	Analysis Date	10/15/2021
Laboratory Sample ID	TW-2 (Dolph) 101221	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/12/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.12	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Comb Eff #2	Analysis Date	10/13/2021
Laboratory Sample ID	Comb Eff 101322	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Eff-OC-1A #2	Analysis Date	10/13/2021
Laboratory Sample ID	Eff-OC-1A 101322	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.005	0.001		

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ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Eff-OC-2A #2	Analysis Date	10/13/2021
Laboratory Sample ID	Eff-OC-2A 101322	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	BP-1 #2	Analysis Date	10/13/2021
Laboratory Sample ID	BP-1 101322	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013211	Preparation Date	10/13/2021
Client Sample ID	Grab #2	Analysis Date	10/13/2021
Laboratory Sample ID	Grab 101322	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

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Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	PW-1	Analysis Date	10/23/2021
Laboratory Sample ID	PW-1 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.Ï Î	0.01		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-18	Analysis Date	10/22/2021
Laboratory Sample ID	TW-18 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.26	0.01		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-21	Analysis Date	10/29/2021
Laboratory Sample ID	TW-21 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.24	0.01		М

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-29	Analysis Date	10/29/2021
Laboratory Sample ID	TW-29 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.29	0.01		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-28	Analysis Date	10/29/2021
Laboratory Sample ID	TW-28 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.64	0.01		М

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-23	Analysis Date	10/29/2021
Laboratory Sample ID	TW-23 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.38	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-22	Analysis Date	10/29/2021
Laboratory Sample ID	TW-22 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.42	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	LB-4	Analysis Date	10/30/2021
Laboratory Sample ID	LB-4 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.43	0.01		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1013212	Preparation Date	10/13/2021
Client Sample ID	TW-2 (Dolph)	Analysis Date	10/30/2021
Laboratory Sample ID	TW-2 (Dolph) 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	5
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1013212	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.1G	0.005		М

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY BLANK SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013211

SDG 1013211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
1.00.4.40/40/04	40/40/0004	10.07.00	4.4.D'	100.01.1			10/-4	0.004		

LRB-1 10/13/21 10/13/2021 10:27:03 1,4-Dioxane 123-91-1 mg/L Wet 0.001

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### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY BLANK SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013212

SDG 1013212 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
100001010101	10/01/0001		4.4.50	100.01.1				2 224		

0.001 LRB-2 10/13/21 10/21/2021 22:46:32 1,4-Dioxane 123-91-1 mg/L Wet



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013211

SDG 1013211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/13/21	10/13/2021	09:42:37	1,4-Dioxane	123-91-1		0.010	0.0095	mg/L	Wet	94.9	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1013211

 SDG
 1013211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101321 MS	10/13/2021	13:24:09	1,4-Dioxane	123-91-1	0.39	0.40	0.78	mg/L	Wet	97.1	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1013211

 SDG
 1013211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101321 MSD	10/13/2021	14:15:03	1,4-Dioxane	123-91-1	0.39	0.40	0.78	mg/L	Wet	96.6	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013212

SDG 1013212 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-2 10/13/21	10/21/2021	22:02:41	1,4-Dioxane	123-91-1		0.010	0.0095	mg/L	Wet	95.3	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013212

SDG 1013212 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 101321 MS	10/30/2021	02:44:27	1,4-Dioxane	123-91-1		0.010	0.0099	mg/L	Wet	99.2	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1013212

 SDG
 1013212

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 101321 MSD	10/30/2021	03:28:14	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	93.7	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY**

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013211

SDG 1013211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 101321 MS	10/13/2021	13:24:09	1,4-Dioxane	123-91-1	0.78		mg/L	Wet			
Red Pond 101321 MSD	10/13/2021	14:15:03	1,4-Dioxane	123-91-1	0.78	0.78	mg/L	Wet	0.26	20	



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY PRECISION SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1013212

SDG 1013212 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 101321 MS	10/30/2021	02:44:27	1,4-Dioxane	123-91-1	0.0099		mg/L	Wet			
ATS Tap Water 101321 MSD	10/30/2021	03:28:14	1,4-Dioxane	123-91-1	0.0094	0.0096	mg/L	Wet	5.6	20	

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290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INFORMATION		SHIPPING	G INFORM	MATION: SI	HIPPER (Ch	eck one) / TF	ACKING NU	MBER(S) (If applicat			
Pall SAMPLE CUSTODIAN (Print & Signaluro)	PO#450	7859WZ	Date		Fed Ex		UPS	DHL	Courler	Tracking Nur	nher	
SAMPLE CUSTODIAN (Print & Signature)	-		Date		Fed Ex		UPS	DHL.	Courier	Tracking Nur		
Gase Trandel (	see- he	now Crancom	Date		Fed Ex		UPS	DHL	Courier	Tracking Nur	nber	
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COMMENTS (Preservation, etc.) 45 day hold the soic Samples needed by 115	ill others—	HCI preserved	<sub>0</sub>	JMBER								MATRIX Indicate Soll/Water/Air
ON BAR CODE DATE	E TIME OO	3	NO. OF CONTAINERS	PRIORITY NUMBER								Sediment/Sludge Extract
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PROJECT ID / NUMBER	1	LABORATORY II	NFORMAT	ON	SHIPPIN	G INFOR	MATION: SHI	PPER (Check one) /	TRACKING NUN	MBER(S) (If application	able)		
Pay		PD-	#4:	504859624			Fed Ex	UPS	DHL	Courie		Tracking Number	
SAMPLE CUSTODIAN (Print & Signature)					Date		Fed Ex	UPS	DHL	Courie	r	Tracking Number	
Casa Trevaled	Gag	7	-e_^	elel @Pallicoi	Date Date		Fed Ex	UPS	DHL	Courie	et.	Tracking Number	
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COMMENTS (Presidvation, etc.) Scruples resided by 11/5. 45 day Wold time		<b>E</b> .	Shu	plus > huproserve	X					ANALYSIS			
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2 Eff-0C-1/1	10/13/21	11:35		)	i		THE STATE OF THE S						
3. EFF-OC-ZA	10/13/21	11:40		The state of the s	O-ED GARAGE	ì	enwert's Ayou'd						
4. DP-1	10/12/21	11:45		The second second	CENTRAL PROPERTY.								
5. Grab	10/13/2	11:50					- Constitution						
6. PW-1	10/321	1					- Company of the Comp						
7. TW-18	10/13/21						- Aller Standard						
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1014211** 

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1014211 Client PO Number: 4504859621** 

### **Case Narrative Summary**

This case narrative applies to the following 12 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/14/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/14/21				
Outfall 001	10/13/21	Urgent	1,4-Dioxane	Water
Red Pond	10/14/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/14/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/14/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/14/21	Urgent	1,4-Dioxane	Water
BP-1	10/14/21	Urgent	1,4-Dioxane	Water
Grab	10/14/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/14/21	Urgent	1,4-Dioxane	Water
MW-48	10/13/21	Standard	1,4-Dioxane	Water
MW-49	10/13/21	Standard	1,4-Dioxane	Water
MW-46	10/13/21	Standard	1,4-Dioxane	Water
MW-50	10/13/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

### Number of Samples

- 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 4 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### **Sample Analysis**

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None



### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

### <u>Laboratory Reagent Blanks</u>

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

• None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/14/21

• MW-50 10/13/21

Mock Glitong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Outfall 001	Analysis Date	10/14/2021
Laboratory Sample ID	Outfall 001 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.004	0.001		

### Comments

Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.

Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Red Pond	Analysis Date	10/14/2021
Laboratory Sample ID	Red Pond 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.36	004		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Comb Eff	Analysis Date	10/14/2021
Laboratory Sample ID	Comb Eff 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/14/2021
Laboratory Sample ID	Eff-OC-1A 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/14/2021
Laboratory Sample ID	Eff-OC-2A 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	BP-1	Analysis Date	10/14/2021
Laboratory Sample ID	BP-1 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Outfall Grab	Analysis Date	10/14/2021
Laboratory Sample ID	Outfall Grab 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	Outfall Test	Analysis Date	10/14/2021
Laboratory Sample ID	Outfall Test 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	MW-48	Analysis Date	10/15/2021
Laboratory Sample ID	MW-48 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.015	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	MW-49	Analysis Date	10/15/2021
Laboratory Sample ID	MW-49 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	MW-46	Analysis Date	10/15/2021
Laboratory Sample ID	MW-46 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.072	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1014211	Preparation Date	10/14/2021
Client Sample ID	MW-50	Analysis Date	10/15/2021
Laboratory Sample ID	MW-50 101321	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/13/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1014211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.50	0.02		

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1014211

 SDG
 1014211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
LDD 4.40/4.4/04	40/44/0004	44440	4.4.6:	100.01.1			10/-4	0.004		

LRB-1 10/14/21 10/14/2021 14:14:18 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1014211

SDG 1014211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/4/21	10/14/2021	13:11:27	1,4-Dioxane	123-91-1		0.010	0.0098	mg/L	Wet	97.9	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1014211

SDG 1014211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101421 MS	10/14/2021	16:26:10	1,4-Dioxane	123-91-1	0.36	0.40	0.71	mg/L	Wet	88.7	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1014211

 SDG
 1014211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101421 MSD	10/14/2021	17:10:09	1,4-Dioxane	123-91-1	0.36	0.40	0.70	mg/L	Wet	86.6	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1014211

 SDG
 1014211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 101421 MS	10/14/2021	16:26:10	1,4-Dioxane	123-91-1	0.71		mg/L	Wet			
Red Pond 101421 MSD	10/14/2021	17:10:09	1,4-Dioxane	123-91-1	0.70	0.71	mg/L	Wet	1.2	20	

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding. Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Leboratory ID: 9604 Wisconsin Laboratory ID: 998321720

	lı.	ABORATORY IN	JEORMAT	ION		SHIPPING	NEORM	ATION: SE	LIPPER (C	heck one) / 1	TRACKING N	UMBED(S)	(If applicable	`			
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1015211** 

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1015211 Client PO Number: 4504859621** 

### **Case Narrative Summary**

This case narrative applies to the following 16 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/15/21, and associated matrix-specific QA/QC:

### Samples

ampies				
Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/15/21				
Outfall 001	10/14/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/15/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/15/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/15/21	Urgent	1,4-Dioxane	Water
BP-1	10/15/21	Urgent	1,4-Dioxane	Water
EffGrab	10/15/21	Urgent	1,4-Dioxane	Water
Outfall Test	10/15/21	Urgent	1,4-Dioxane	Water
Red Pond	10/15/21	Urgent	1,4-Dioxane	Water
MW-129I	10/14/21	Standard	1,4-Dioxane	Water
MW-129S	10/14/21	Standard	1,4-Dioxane	Water
MW-129d	10/14/21	Standard	1,4-Dioxane	Water
MW-107	10/14/21	Standard	1,4-Dioxane	Water
TW-5	10/14/21	Standard	1,4-Dioxane	Water
TW-11	10/14/21	Standard	1,4-Dioxane	Water
TW-14	10/14/21	Standard	1,4-Dioxane	Water
TW-17	10/14/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

• 1,4-Dioxane (USEPA 1624) – Standard TAT

### Number of Samples

- 8 Samples
- 8 Samples

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

None

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None



### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None

### **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

### <u>Laboratory Fortified Blanks / Laboratory Control Samples</u>

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/15/21

• MW-107 10/14/21

• TW-5 10/14/21

• TW-11 10/14/21

• TW-14 10/14/21

Mock alizong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Outfall 001	Analysis Date	10/15/2021
Laboratory Sample ID	Outfall 001 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731

Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Comb Eff	Analysis Date	10/15/2021
Laboratory Sample ID	Comb Eff 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.004	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/15/2021
Laboratory Sample ID	Eff-OC-1A 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/15/2021
Laboratory Sample ID	Eff-OC-2A 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.004	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	BP-1	Analysis Date	10/15/2021
Laboratory Sample ID	BP-1 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.004	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Outfall Grab	Analysis Date	10/15/2021
Laboratory Sample ID	Outfall Grab 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.004	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Outfall Test	Analysis Date	10/15/2021
Laboratory Sample ID	Outfall Test 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.004	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	Red Pond	Analysis Date	10/15/2021
Laboratory Sample ID	Red Pond 101521	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/15/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.33	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	MW-129I	Analysis Date	10/30/2021
Laboratory Sample ID	MW-129I 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	MW-129S	Analysis Date	10/30/2021
Laboratory Sample ID	MW-129S 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	MW-129D	Analysis Date	10/30/2021
Laboratory Sample ID	MW-129D 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.002	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	MW-107	Analysis Date	10/30/2021
Laboratory Sample ID	MW-107 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	20
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.53	0.02		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	TW-5	Analysis Date	10/30/2021
Laboratory Sample ID	TW-5 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.59	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	TW-11	Analysis Date	10/30/2021
Laboratory Sample ID	TW-11 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.16	0.01		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	TW-14	Analysis Date	10/30/2021
Laboratory Sample ID	TW-14 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	5
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.11	0.005		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1015211	Preparation Date	10/15/2021
Client Sample ID	TW-17	Analysis Date	10/30/2021
Laboratory Sample ID	TW-17 101421	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/14/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	5
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1015211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.077	0.005		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1015211

 SDG
 1015211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
I DR 1 10/15/21	10/15/2021	05:27:50	1.4-Diovana	122 01 1		ma/l	\\/ot	0.001		

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1015211

SDG 1015211 Project Number: G001-002.21 Report Date: 11/4/2021

### Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/15/21	10/15/2021	04:54:03	1,4-Dioxane	123-91-1		0.010	0.0097	mg/L	Wet	97.2	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1015211

SDG 1015211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 10/15/21 MS	10/15/2021	06:21:46	1,4-Dioxane	123-91-1		0.40	0.42	mg/L	Wet	104	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



### **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1015211

SDG 1015211 Project Number: G001-002.21 Report Date: 11/4/2021

### Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
ATS Tap Water 10/15/21 MSD	10/15/2021	07:05:37	1,4-Dioxane	123-91-1		0.40	0.38	mg/L	Wet	93.8	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1015211

 SDG
 1015211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

### Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
ATS Tap Water 10/15/21 MS	10/15/2021	06:21:46	1,4-Dioxane	123-91-1	0.42		mg/L	Wet			
ATS Tap Water 10/15/21 MSD	10/15/2021	07:05:37	1,4-Dioxane	123-91-1	0.38	0.40	mg/L	Wet	10	20	

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wiscontin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INF	ormation 1504785967	-1	Г	INFORM			one) / TRACK	ſ	BER(S) (If applica		1 г	
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	5/2108:20												
7. Outfall -Test 10/11	5/21 08:25												
8. Cours. Eff. Real Pand 10/1	5/21 08:00												
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	1/2/1227												
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

ATS SDG: 1018211

### **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



# LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1018211 Client PO Number: 4504859621** 

### **Case Narrative Summary**

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/18/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/18/21				
Outfall 001	10/17/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/18/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/18/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/18/21	Urgent	1,4-Dioxane	Water
BP-1	10/18/21	Urgent	1,4-Dioxane	Water
OF-Grab	10/18/21	Urgent	1,4-Dioxane	Water
OF-Test	10/18/21	Urgent	1,4-Dioxane	Water
Red Pond	10/18/21	Urgent	1,4-Dioxane	Water
MW-142 (38-46')	10/18/21	Urgent	1,4-Dioxane	Water
MW-142 (56')	10/18/21	Urgent	1,4-Dioxane	Water
MW-142 (66')	10/18/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### **Analysis**

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

### Number of Samples

• 11 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

### Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

- The following samples were received un-preserved and analyzed at native pH.
  - o MW-142 (38-46') 10/18/21
  - o MW-142 (56') 10/18/21
  - o MW-142 (66') 10/18/21

### **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

### **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

### Sample Analysis

<u>1,4-Dioxane Analysis (GC/MS)</u>: Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

### **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

None



### **Instrument Blanks**

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None

### **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None

### **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

• None

### Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

### Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

Lab Sample ID	Constituent	Percent Recovery	Acceptance Limits
T			
Red Pond 10/18/21 MSD	1,4-Dioxane	78.5	80-120%

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



### **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/18/21

is seen g

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Outfall 001	Analysis Date	10/18/2021
Laboratory Sample ID	Outfall 001 101721	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/17/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Comb Eff	Analysis Date	10/18/2021
Laboratory Sample ID	Comb Eff 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/18/2021
Laboratory Sample ID	Eff-OC-1A 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/18/2021
Laboratory Sample ID	Eff-OC-2A 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.005	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	BP-1	Analysis Date	10/18/2021
Laboratory Sample ID	BP-1 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Outfall Grab	Analysis Date	10/18/2021
Laboratory Sample ID	Outfall Grab 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Outfall Test	Analysis Date	10/18/2021
Laboratory Sample ID	Outfall Test 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	Red Pond	Analysis Date	10/18/2021
Laboratory Sample ID	Red Pond 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.43	0.04		M

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	MW-142 (38-46')	Analysis Date	10/19/2021
Laboratory Sample ID	MW-142 (38-46') 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	MW-142 (56')	Analysis Date	10/19/2021
Laboratory Sample ID	MW-142 (56') 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	 Basis	Wet
QC Batch Number	QCORG1018211	 Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1018211	Preparation Date	10/18/2021
Client Sample ID	MW-142 (66')	Analysis Date	10/19/2021
Laboratory Sample ID	MW-142 (66') 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1018211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Office: 734-995-0995

Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1018211

 SDG
 1018211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
100 440/40/04	40/40/0004	00.04.40	4.4.D'	100.01.1			10/-4	0.004		

LRB-1 10/18/21 10/18/2021 09:34:19 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1018211

SDG 1018211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/18/21	10/18/2021	08:47:33	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	94.1	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1018211

SDG 1018211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101821	10/18/2021	22:20:28	1,4-Dioxane	123-91-1	0.43	0.40	0.82	mg/L	Wet	96.8	80	120	

MS

Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1018211

 SDG
 1018211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101821 MSD	10/18/2021	23:04:21	1,4-Dioxane	123-91-1	0.43	0.40	0.75	mg/L	Wet	78.5	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1018211

 SDG
 1018211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
F	Red Pond 101821 MS	10/18/2021	22:20:28	1,4-Dioxane	123-91-1	0.82		mg/L	Wet			
F	Red Pond 101821 MSD	10/18/2021	23:04:21	1,4-Dioxane	123-91-1	0.75	0.78	mg/L	Wet	9.4	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

1018.211

	CT ID / NUMBER		LABORATORY	INFORI	MATIC	ON	SHIPPIN	G INFORM	ATION: S	SHIPPER (C	Check one)	/TRACKING N	JMBER(S) (	If applicable	e)				
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LINE NO.	BAR CODE	DATE	TIME	COMP.	SRAB	SAMPLE IDENTIFICATION	NO. OF CONTAINERS	PRIOR											
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2.		10/18/-2				32.							1				-	-	
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4.	3		7:20				-	-		-				-					
	BP-1	10/12/	7:25				ļ		ļ										
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290 South Wagner Road Ann Arbor, Michigan 48193 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory (D: 9604 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	l	ABORATORY II	NFORMAT	ON O 3 1	SHIPPING	INFORM	ATION: SHI	PPER (C	heck one) / TR	ACKING NUN	IBER(S) (If ap	plicable	*)		
PROJECT ID / NUMBER PALL Samples SAMPLE CUSTODIAN (Prioria Signalura) Mitch Downski //R)		PO#4	504	859671	Date		Fed Ex		UPS	DHL	Co	urier	Trac	king Number	
SAMPLE CUSTODIAN (Print & Signature)		-			Date		Fed Ex		UPS	DHL	Co	urier	Trac	king Number	
Mitch Volminski /1					Date		Fed Ex		UPS	DHL	Co	urier	Trac	king Number	
					Date		Fed Ex		UPS	DHL		ourler		king Number	
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COMMENTS (Preservation, etc.)											ANALYSIS				
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o l			<u> </u>		AINE	Y Y	NoX								Sediment/Sludge Extract
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1.	12/18/2	1301	1/		2		X								(1)
	12/0/2/	1255	1/	MW-142 (56)	7		X								210
2.	11/19/21	1445	17	MW-142 (66)	15	-	(V)			<del>-   -</del>				-	5/0
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1019211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1019211 Client PO Number: 4504859621** 

## **Case Narrative Summary**

This case narrative applies to the following ten samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/19/21, and associated matrix-specific QA/QC:

### Samples

Samples				
Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/19/21				
Outfall 001	10/18/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/19/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/19/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/19/21	Urgent	1,4-Dioxane	Water
BP-1	10/19/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/19/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/19/21	Urgent	1,4-Dioxane	Water
Red Pond	10/19/21	Urgent	1,4-Dioxane	Water
TW-20	10/18/21	Standard	1,4-Dioxane	Water
TW-24	10/18/21	Standard	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

### Analysis

- 1,4-Dioxane (USEPA 1624) Urgent TAT
- 1,4-Dioxane (USEPA 1624) Standard TAT

## Number of Samples

- 8 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate
- 2 Samples

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

• None

G001-002.21/CN\_1019211.doc

## **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

None

## **Analytical QA/QC Summary**

### Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None

### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

• None

## **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

• None



## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

None

## Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

• None

## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• TW-20 10/18/21

• TW-24 10/18/21

• Red Pond 10/19/21

Mouldistong

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

/ November 4, 2021

Philip B. Simon (Laboratory Director)





ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Outfall 001	Analysis Date	10/19/2021
Laboratory Sample ID	Outfall 001 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Diovane	123-01-1	0.007	0.001	·	

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Comb Eff	Analysis Date	10/19/2021
Laboratory Sample ID	Comb Eff 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/19/2021
Laboratory Sample ID	Eff-OC-1A 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/19/2021
Laboratory Sample ID	Eff-OC-2A 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	BP-1	Analysis Date	10/19/2021
Laboratory Sample ID	BP-1 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Outfall Test	Analysis Date	10/19/2021
Laboratory Sample ID	Outfall Test 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Outfall Grab	Analysis Date	10/19/2021
Laboratory Sample ID	Outfall Grab 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.007	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	Red Pond	Analysis Date	10/19/2021
Laboratory Sample ID	Red Pond 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.41	0.04		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	TW-20	Analysis Date	10/19/2021
Laboratory Sample ID	TW-20 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	10
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.83	0.01		M

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1019211	Preparation Date	10/19/2021
Client Sample ID	TW-24	Analysis Date	10/19/2021
Laboratory Sample ID	TW-24 101821	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/18/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1019211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	1.8	0.04		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.

Office: 734-995-0995 Fax: 734-995-3731



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1019211

 SDG
 1019211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
100 4 40/40/04	40/40/0004	11.01.00	4.4.D'	100.01.1			10/-4	0.004		

LRB-1 10/19/21 10/19/2021 11:34:09 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1019211

SDG 1019211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/19/21	10/19/2021	10:50:11	1,4-Dioxane	123-91-1		0.010	0.0094	mg/L	Wet	94.5	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1019211

SDG 1019211 Project Number: G001-002.21 Report Date: 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101921 MS	10/19/2021	19:25:16	1,4-Dioxane	123-91-1	0.41	0.40	0.82	mg/L	Wet	103	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1019211

 SDG
 1019211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 101921 MSD	10/19/2021	20:09:13	1,4-Dioxane	123-91-1	0.41	0.40	0.78	mg/L	Wet	91.5	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



## QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1019211

 SDG
 1019211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

	Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
R	Red Pond 101921 MS	10/19/2021	19:25:16	1,4-Dioxane	123-91-1	0.82		mg/L	Wet			
R	Red Pond 101921 MSD	10/19/2021	20:09:13	1,4-Dioxane	123-91-1	0.78	0.80	mg/L	Wet	5.9	20	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.

M - Indicates elevated reporting limit based upon sample dilution.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

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4	Eff-OC-ZA	10/19/21												
	3P-1	10/19/21	7:20											
٠ [	Outfell-Test	10/19/21	7:25											
*.	Outfall - Gralo	10/19/21	7:30											
	Red Pond	10/19/21	7:05		1									
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# ORGANIC ANALYSIS 1,4-Dioxane by GC/MS USEPA 1624

ATS Project Number: G001-002.21

**ATS SDG: 1020211** 

## **Prepared By:**

Ann Arbor Technical Services, Inc. 290 South Wagner Road Ann Arbor, MI 48103



## LABORATORY OPERATIONS CASE NARRATIVE

ATS Project Number: G001-002

**Report Date: 11/4/21** 

**SRF / SDG Number(s): 1020211 Client PO Number: 4504859621** 

## **Case Narrative Summary**

This case narrative applies to the following 11 samples that were received at Ann Arbor Technical Services, Inc. (ATS) on 10/20/21, and associated matrix-specific QA/QC:

### **Samples**

Client Sample Identification	Sample Date	Requested Turn Around Time	Analysis	Matrix
Received 10/20/21				
Outfall 001	10/19/21	Urgent	1,4-Dioxane	Water
Comb Eff	10/20/21	Urgent	1,4-Dioxane	Water
Eff-OC-1A	10/20/21	Urgent	1,4-Dioxane	Water
Eff-OC-2A	10/20/21	Urgent	1,4-Dioxane	Water
BP-1	10/20/21	Urgent	1,4-Dioxane	Water
Outfall-Grab	10/20/21	Urgent	1,4-Dioxane	Water
Outfall-Test	10/20/21	Urgent	1,4-Dioxane	Water
Red Pond	10/20/21	Urgent	1,4-Dioxane	Water
MW-142 (72')	10/19/21	Urgent	1,4-Dioxane	Water
MW-142 (107'-112')	10/19/21	Urgent	1,4-Dioxane	Water
MW-142 (128'-133')	10/19/21	Urgent	1,4-Dioxane	Water

Upon receipt samples were scheduled for the following analyses.

## **Analysis**

• 1,4-Dioxane (USEPA 1624) – Urgent TAT

## Number of Samples

• 11 Samples + 1 Matrix Spike + 1 Matrix Spike Duplicate

## Sample Receipt, Chain of Custody Records, and Holding Times

Samples were delivered directly to ATS by Pall Corporation staff. Samples were received with proper chain of custody records included. Sample condition and anomalies, if any, are either presented in the "Sample Receipt" section of this report or in the comments on individual data sheets. All samples were prepared and analyzed within 45 days with the following exceptions:

- The following samples were received un-preserved and analyzed at native pH.
  - o MW-142 (72') 10/19/21

## **Data Review and Approval**

All data contained in this report have been generated in accordance with guidelines provided in the referenced standard test method, and are consistent with detailed procedures described in a written standard operating procedures (SOPs) specific to the ATS Laboratory, as required by USEPA. All data are peer and management reviewed to ensure compliance with the above referenced SOP's and project specifications. In addition, all data conform to the laboratory's Quality Assurance / Quality Control Manuals.

A single QA/QC batch is defined as no more than 20 samples excluding method blanks (MB, LRB), fortified blanks (BS, LFB, LCS), matrix spikes (MS, SPK), and duplicates whether spiked or native (MSD, SPK DUP, DUP, LR).

## **Data Deliverables**

This data package constitutes a Level II package; other data report packages (Level I, Level IV DVP, EPA R5 EDD) are available upon request. There were no hardcopy data summary sheets generated for this project.

## Sample Analysis

1,4-Dioxane Analysis (GC/MS): Samples were analyzed by purge and trap GC/MS in accordance with USEPA method 1624 (Volatile Organic Compounds by Isotope Dilution Gas Chromatography – Mass Spectrometry). An initial calibration with at least five levels was used to quantitate 1,4-Dioxane. Samples were reported to project specific reporting limits. Samples were reported as mg/L.

Anomalies Noted:

• None

## **Analytical QA/QC Summary**

## Calibration Verification

Method calibration was verified through the analysis of a mid-level initial calibration verification (CV) standard at a frequency of every 12 hours. All verification standards met the acceptance criteria with the following exceptions:

• None



### Instrument Blanks

Low system background was demonstrated through the analysis of instrument blanks at a minimum of every 12 hours. All instrument blanks met the acceptance criteria with the following exceptions:

None

## **QA/QC Batch Summary**

### **Internal Standards**

Internal standards areas and retention times met the acceptance criteria with the following exceptions:

None

## **Laboratory Reagent Blanks**

A laboratory reagent blank (LRB) was analyzed with each QA/QC batch. The LRB's met the acceptance criteria with the following exceptions:

None

## Laboratory Fortified Blanks / Laboratory Control Samples

A laboratory fortified blank (LFB) was analyzed with each QA/QC batch. The LFB's met the acceptance criteria with the following exceptions:

• None

## Matrix Spikes and Spike Duplicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The MS/MSD's met the acceptance criteria with the following exceptions:

Lab Sample ID	Constituent	Percent Recovery	Acceptance Limits	
Red Pond 10/20/21 MSD	1,4-Dioxane	78.5	80-120%	

### Matrix Replicates

A matrix spike (MS) and matrix spike duplicate (MSD) was analyzed with each QA/QC batch. The replicates met the acceptance criteria with the following exceptions:

None



## **Sample Dilutions**

Samples containing compounds at concentrations above the initial calibration curve were diluted and reanalyzed for those compounds. The following samples were diluted for 1,4-Dioxane:

• Red Pond 10/20/21

/ November 4, 2021

Mark T. DeLong (Quality Assurance Coordinator)

Philip B. Simon (Laboratory Director)

/ November 4, 2021



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Outfall 001	Analysis Date	10/20/2021
Laboratory Sample ID	Outfall 001 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731

### Comments



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Comb Eff	Analysis Date	10/20/2021
Laboratory Sample ID	Comb Eff 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1 4-Dioxane	123-91-1	0.008	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.

Office: 734-995-0995 Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Eff-OC-1A	Analysis Date	10/20/2021
Laboratory Sample ID	Eff-OC-1A 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.006	0.001		

Office: 734-995-0995

Fax: 734-995-3731



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Eff-OC-2A	Analysis Date	10/20/2021
Laboratory Sample ID	Eff-OC-2A 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-01-1	0.000	0.001		

Office: 734-995-0995

Fax: 734-995-3731

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	BP-1	Analysis Date	10/20/2021
Laboratory Sample ID	BP-1 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioxane	123-91-1	0.008	0.001		

Office: 734-995-0995

Fax: 734-995-3731

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Outfall Grab	Analysis Date	10/20/2021
Laboratory Sample ID	Outfall Grab 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.008	0.001		

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Outfall Test	Analysis Date	10/20/2021
Laboratory Sample ID	Outfall Test 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

Parameter	Chemical Identifier	Result	MDL	PQL	Qual
1.4-Dioyane	123-91-1	0.008	0.001		

Office: 734-995-0995

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Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	Red Pond	Analysis Date	10/20/2021
Laboratory Sample ID	Red Pond 102021	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/20/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	40
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	0.40	0.04		M

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Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	MW-142 (72')	Analysis Date	10/20/2021
Laboratory Sample ID	MW-142 (72') 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.
Sample analyzed at natitve pH.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	MW-142 (107-112')	Analysis Date	10/20/2021
Laboratory Sample ID	MW-142 (107-112') 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



ATS Project Number	G001-002.21	Percent Moisture	100
ATS SDG Number	1020211	Preparation Date	10/20/2021
Client Sample ID	MW-142 (128-133')	Analysis Date	10/20/2021
Laboratory Sample ID	MW-142 (128-133') 101921	Instrument	2100V
Matrix	Water	Subsample (mL)	5
Sample Date	10/19/2021	Final Volume (mL)	5
Analytical Method (USEPA)	USEPA 1624	Dilution Factor	1
Preparation Method (USEPA)	USEPA 1624	Basis	Wet
QC Batch Number	QCORG1020211	Units	mg/L

	Chemical				
Parameter	Identifier	Result	MDL	PQL	Qual
1,4-Dioxane	123-91-1	ND	0.001		U

Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.
M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY BLANK SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1020211

 SDG
 1020211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Laboratory Reagent Blank (LRB) / Method Blank (MB)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Units	Basis	Method Detection Limit	Reporting Detection Limit	Comments
I DD 1 10/20/21	10/20/2021	10:52:42	1.4 Dioyono	122 01 1		ma/l	\\/ot	0.004	. 3	

LRB-1 10/20/21 10/20/2021 10:52:42 1,4-Dioxane 123-91-1 mg/L Wet 0.001

### Comments

All methods reference US EPA methods unless otherwise noted. Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



## **QUALITY ASSURANCE / QUALITY CONTROL SUMMARY** LABORATORY ACCURACY SUMMARY

Method: **USEPA 1624** QA/QC Batch Number: QCORG1020211

SDG 1020211 Project Number: G001-002.21 Report Date: 11/4/2021

## Laboratory Fortified Blank (LFB) / Laboratory Control Sample (LCS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
LCS-1 10/20/21	10/20/2021	11:37:35	1,4-Dioxane	123-91-1		0.010	0.0093	mg/L	Wet	92.8	85	115	

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard. M - Indicates elevated reporting limit based upon sample dilution.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1020211

 SDG
 1020211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102021 MS	10/20/2021	19:02:01	1,4-Dioxane	123-91-1	0.40	0.40	0.75	mg/L	Wet	86.6	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY ACCURACY SUMMARY

Method: USEPA 1624

QA/QC Batch Number: QCORG1020211

 SDG
 1020211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Sample Concentration	Spike Added	Measured Concentration	Units	Basis	Percent Recovery	LCL	UCL	Comments
Red Pond 102021 MSD	10/20/2021	19:46:02	1,4-Dioxane	123-91-1	0.40	0.40	0.72	mg/L	Wet	78.5	80	120	

### Comments

All methods reference US EPA methods unless otherwise noted.

Calculations performed prior to rounding.

Project specific reporting limit (MDL) based upon lowest calibration standard.



# QUALITY ASSURANCE / QUALITY CONTROL SUMMARY LABORATORY PRECISION SUMMARY

Method: USEPA 1624
QA/QC Batch Number: QCORG1020211

 SDG
 1020211

 Project Number:
 G001-002.21

 Report Date:
 11/4/2021

## Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Lab Sample ID	Analysis Date	Analysis Time	Chemical Name	CAS	Result	Mean	Units	Basis	RPD	Control Limit	Comments
Red Pond 102021 MS	10/20/2021	19:02:01	1,4-Dioxane	123-91-1	0.75		mg/L	Wet			
Red Pond 102021 MSD	10/20/2021	19:46:02	1,4-Dioxane	123-91-1	0.72	0.73	mg/L	Wet	4.4	20	

### Comments

All methods reference US EPA methods unless otherwise noted.
Calculations performed prior to rounding.
Project specific reporting limit (MDL) based upon lowest calibration standard.



290 South Wagner Road Ann Arbor, Michigan 48103 Tel. 734/995-0995 Fax. 734/995-3731 Michigan Laboratory ID: 9604 Wisconsin Laboratory ID: 998321720

PROJECT ID / NUMBER	LABORATORY INFORMAT	ION	SHIPPING	3 INFORM	MATION: S	HIPPER (C	 Check one	) / TRACKI	NG NUM	IBER(S) (I	f applicabl	e)			
Pall	PC#450	4859621	Date		Fed Ex		UPS		DHL		Courier		Tracking Num	her	
CAMPLE CUSTODIAN			Date		Fed Ex		UPS		DHL		Courier		Tracking Num		
Gage Trevolet	Crace The	ender allicon	Date		Fed Ex		UPS		DHL		Courier		Tracking Num	_	
	DATE / TIME		Date		Fed Ex		UPS		DHL		Courier		Tracking Num		
RELINQUISHED BY (Plint & Signatura)	DVIELUME	RECEIVED BY (Print & Signature)	DATE	/TIME	RELINQUI	ISHED BY	(Print & Sign	alute)		DATE	/TIME	RECEIVED	BY (Frint & Sign	zture)	DATE / TIME
Cage Trendel  RELINQUISHED BY (Petal & Signature)	10119121	3 10/20/21													
GELL	BATE/TIME	RECEIVED BY (Frint & Stonature)	DATE	/TIME	RELINQU	ISHED BY	(Print & Sign	atura)		DATE	/TIME	RECEIVED	BY (Print & Sign	oture)	DATE / TIME
COMMENTS (Preservation, etc.)	Outfall Fifs -	- no-presented	1						A	NALYSI	IS		-		
comments (preservation, etc.) Surples weedled with zer hours 45 day hold thurs tok	All others	-> HCI preservative	RS	NUMBER	1,4-Distant	de	7	5	etc	in th					MATRIX Indicate Soll/Water/Air Sediment/Sludge
O N N N N N N N N N N N N N N N N N N N	GOMP.	SAMPLE IDENTIFICATION	NO. OF CONTAINERS	PRIORITY NUMBER	1-4-1	Chloride	S. Hake	Tron	N Hoste	Alkaliwite					Extract
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